

KEY TO THE FRESHWATER FISHES OF MARYLAND

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Graphics by D.A. Neely

This key to the freshwater fishes of Maryland was prepared for the Maryland Biological Stream Survey to support field and laboratory identifications of fishes known to or potentially occurring in Maryland waters. A number of existing taxonomic keys were used to prepare the initial version of this key to provide a more complete set of identifiable features for each species and minimize the possibility of incorrectly identifying new or newly introduced species. Since that time, we have attempted to remove less useful information from the key and have enriched the key by adding illustrations. Users of this key should be aware of the possibility of taking a fish species not listed, especially in areas near the head-of-tide.

Glossary of anatomical terms

Ammocoete -Larval lamprey

Basal -Toward the base or body of an object

Branchial groove -Horizontal groove along which the gill openings are aligned in lampreys.

Branchiostegal membranes -Membranes extending below the opercles and connecting at the throat.

Branchiostegal ray -Splint like bone in the branchiostegal membranes.

Caudal peduncle -Slender part of body between anal and caudal fin.

Circumoral teeth -Teeth in adult lampreys surrounding throat opening (excluding supraoral and infraoral plates or laminae).

Ctenoid scales -Scales with minute spines (ctenii), not smooth to the touch.

Cycloid scales -Smooth, round scales that lack minute spines (ctenii).

Epi- (Prefix) -Upon, above.

Falcate -Pertaining to fins in which medial rays are shorter than anterior or posterior rays creating a distinctly concave or sickle shaped margin.

Frenum -Small bridge of tissue binding snout to medial portion of the premaxilla of upper jaw. Therefore, the upper jaw lacks a distinct crease between it and the front of the snout, and protrusion of the jaw is limited or impossible.

Gill rakers -Series of projections along anterior edge of gill arches that project into throat cavity.

Gular area -Underside of head, including chin and slightly behind.

Gular plate -Bony plate in throat in some primitive fishes.

Hyoid -Series of bones anterior to the gill arches and extending forward in the floor of the mouth (tongue).

Hyoid teeth -Teeth attached to the hyoid (tongue).

Imbricate -Overlapping

Infra- (Prefix) -Below.

Infraorbital canal -Canal below the eye.

Intra- (Prefix) -Within.

Inter- (Prefix) -Between.

Isthmus -Place of attachment of gill membranes to breast.

Lateral field -Area of scale between anterior and posterior fields.

Mandible -Lower jaw

Mandibular pores -Series of pores on the ventral surface of mandible.

Maxillary -Upper jaw

Myomeres -Dorsoventrally oriented muscle bundle on side of fish.

Myoseptum -Juncture between myomeres.

Palatine teeth -Small teeth just posterior or lateral to the medial vomer.

Papilla -Round fleshy protuberance, may be knoblike or elongate.

Papillose -Bearing papillae

Parr marks -Square or oblong marks on the sides of juvenile trout or salmon

Peritoneum -Lining of the abdominal cavity.

Pharyngeal teeth -Teeth arising from the last (posterior) gill arch.

Plicate -Having parallel fleshy ridges and grooves as in the lips of some suckers.

Pre- (Prefix) -Before, in front of

Premaxilla -Anterior bone of upper jaw, usually forms much of the side of lower jaw in fishes with protrusile jaw.

Preopercular-mandibular (POM) canal -Pores found on the ventral anterior margin of the mandible (chin).

Procurent rays -Small splint like rays at origin of fin.

Pseudobranchium -Small patch of gill filaments attached to the inside surface of the gill cover; not attached to the gill arches.

Radii -Nonconcentric lines radiating from the focus on scales

Rudimentary rays -Small undeveloped rays.

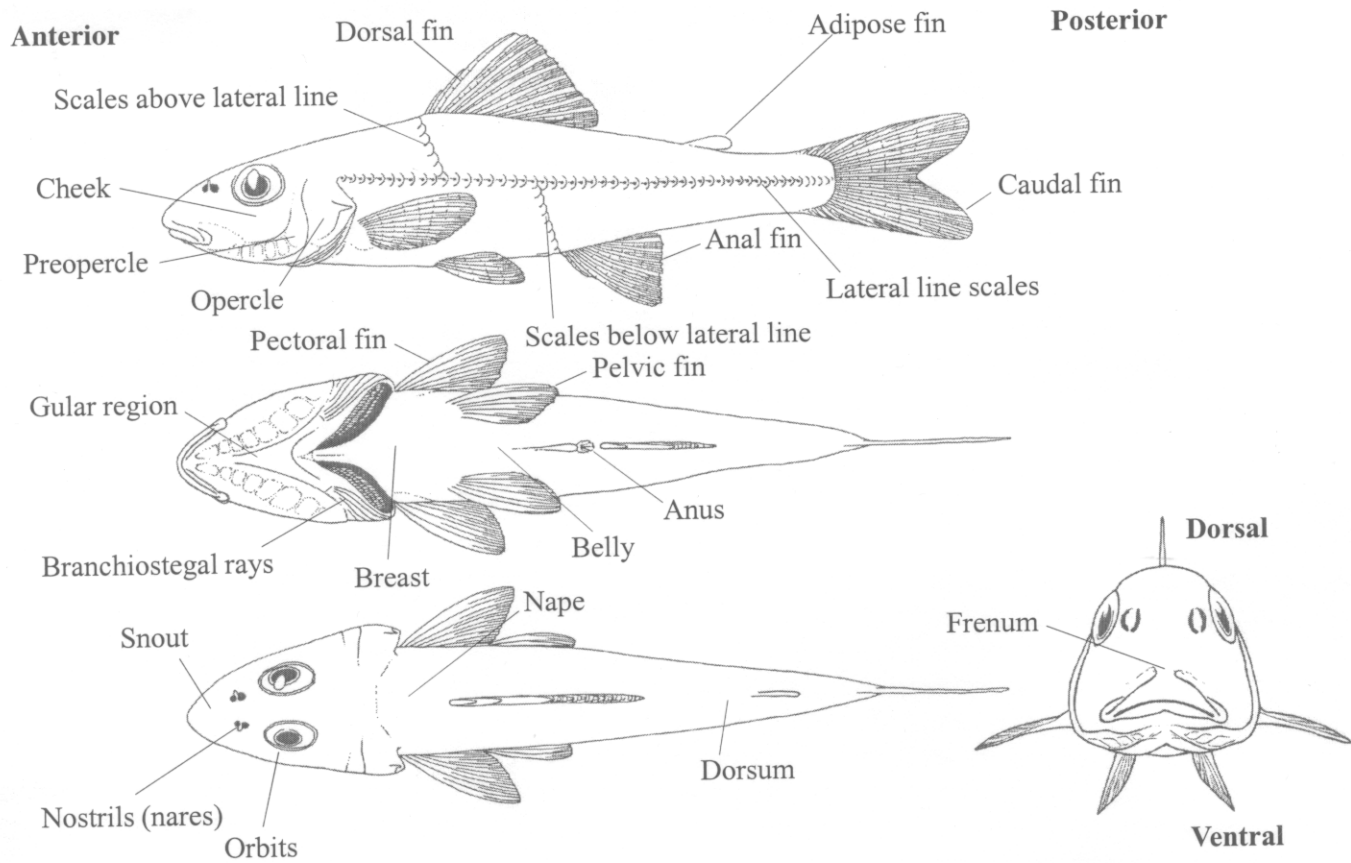
Stellate -Star shaped, with few to many radiating points.

Supra- (Prefix) -Above.

Supratemporal canal -Canal across the back of the head.

Vomer -Median bone in the roof of the mouth.

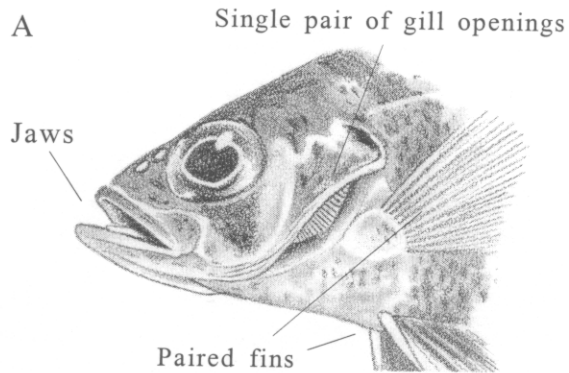
Vomerine teeth -Small, usually densely aggregated teeth occurring on the roof of the mouth.



KEYS TO FAMILIES

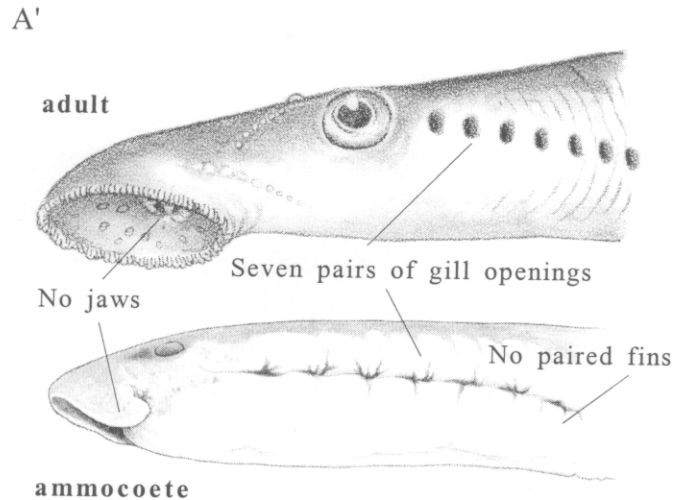
- A. One pair of external gill openings, jaws and paired fins present.

Go to B.



- A'. Seven pairs of gill openings, no jaws, body snakelike, no pelvic or pectoral fins. Mouth in the center of a sucking disk or fringed with tentacles and shielded by a flexible hood. No visible teeth, eyes undeveloped or covered with thick skin so that they are not visible externally (ammocoete larvae), or mouth surrounded by a round sucking disk, without a fleshy hood. Disk with horny teeth in patches or radiating in rows, eyes plainly visible (adults).

Petromyzontidae
Lampreys, p. 16

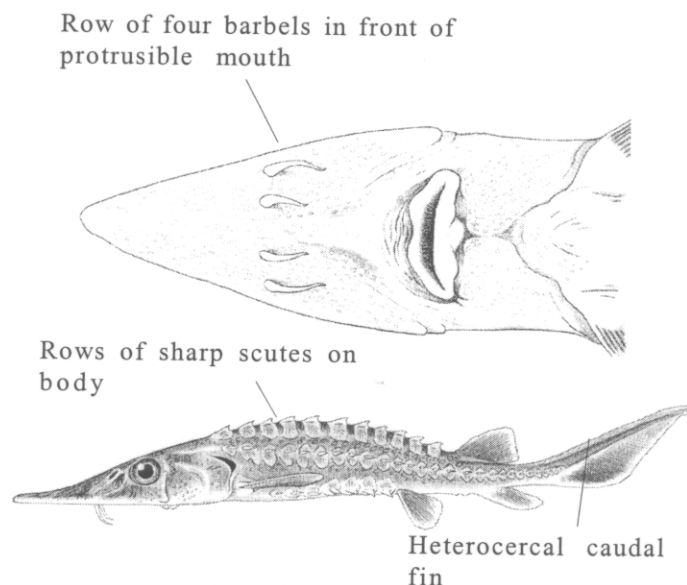


- B. Body without rows of sharp scutes.

Go to C.

- B'. Body with five rows of sharp scutes. Head flattened, mouth subterminal, jaws protrusible. A row of four barbels under snout in front of mouth. Caudal fin heterocercal.

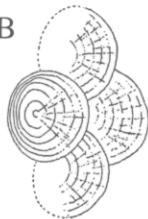
Acipenseridae
Sturgeons, p. 18



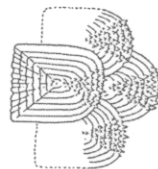
C. Body covered with thin scales or no scales.

Go to D.

B



Cycloid...



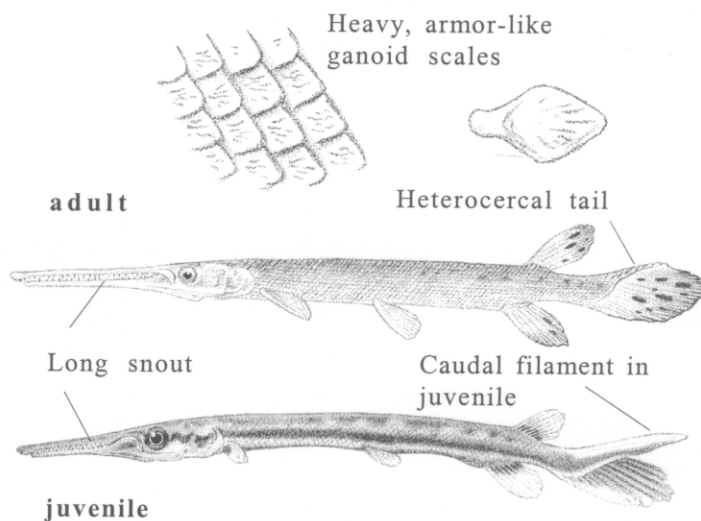
ctenoid...

or no scales

C'. Body (except head) covered with thick, non-overlapping, diamond-shaped scales. Jaws elongate (more than 20% of the body length), with sharp teeth. Caudal fin heterocercal. Origin of dorsal fin posterior to anal fin origin. Juveniles with a prominent filament above the upper lobe of the tail. Median fins and posterior portion of body with large black spots. Usually close to tidewater.

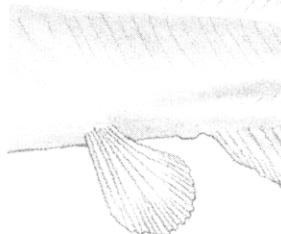
Lepisosteidae

Lepisosteus osseus, longnose gar



D. Pelvic fins present, body not snakelike and flexible.

Go to E.

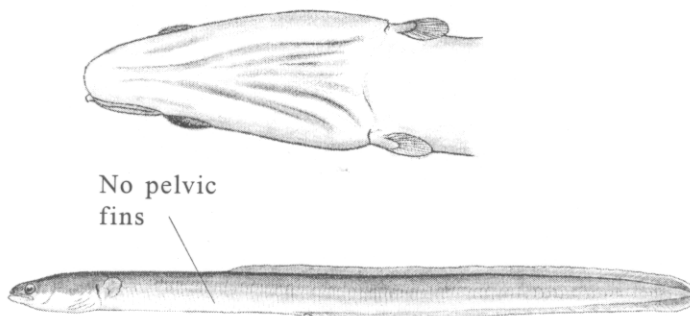


Pelvic fins either thoracic or abdominal

D'. Pelvic fins absent, body slender and flexible, dorsal and anal fins joined to caudal fin by membrane.

Anguillidae

Anguilla rostrata, American eel



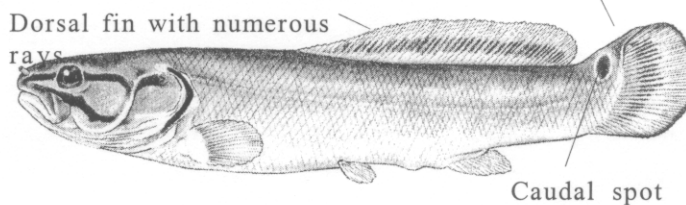
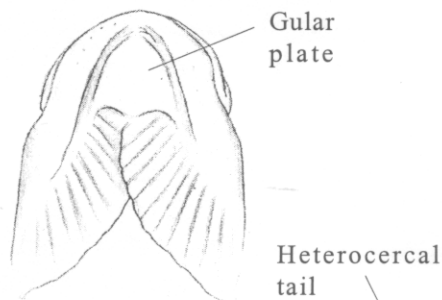
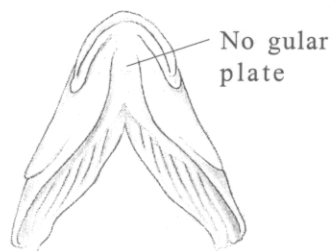
- E. Chin without a flat bony (gular) plate between the lower jaws.

Go to

- E'. A short, broad, bony gular plate between the mandibles. Dorsal fin long, with more than 45 soft rays extending over 1/2 of the body length. Caudal fin heterocercal. Scales cycloid, large and rectangular, upper base of tail with a conspicuous dark spot. Typically found in large rivers. Potomac River drainage, and possibly Gunpowder River.

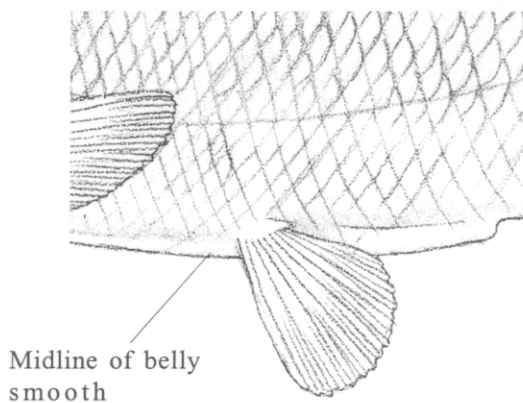
Amiidae

Amia calva, bowfin



- F. Belly flat or round, if keel-like, ventral margin of abdomen lacking modified scales that form a sharp, serrated edge.

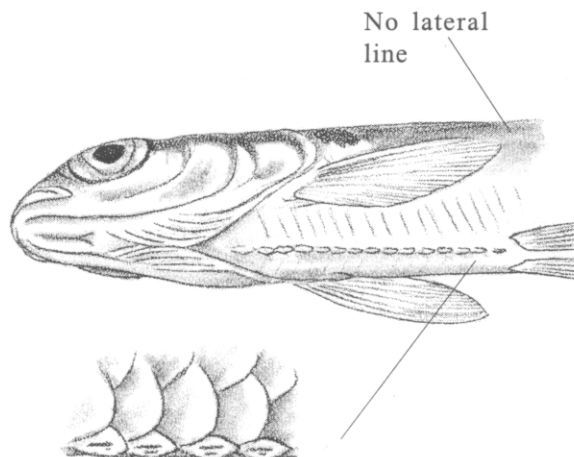
Go to



- F'. Modified scales along the center of the belly forming a saw edge. Belly compressed. Base of dorsal fin over pelvic fin base. Lateral line absent.

Clupeidae

Herrings, p. 19



Sharp, saw-toothed keel on ventral midline

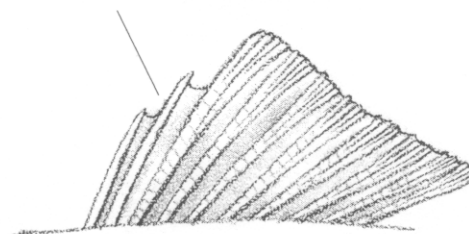
- G.** Dorsal fin without spines, or with less than 3 true spines (disregard any splint-like elements that are less than half as long as the first full-length ray).

Go to **H.**

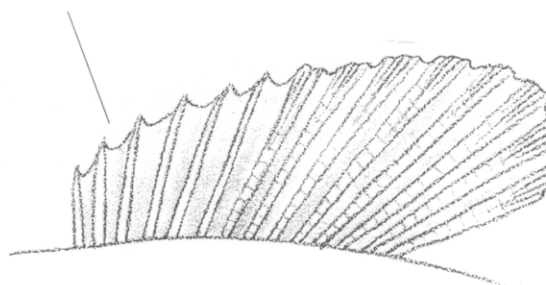
- G'.** Dorsal fin with three or more true spines (neither segmented nor branched) in the anterior region.

Go to **Q.**

Less than three true spines
at front of fin



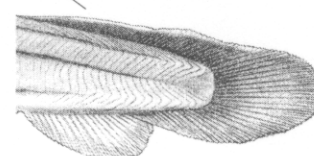
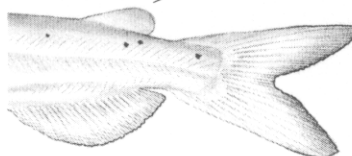
More than three true
spines at front of fin



Fleshy adipose fin
present

- H.** Adipose fin present (may be fused to caudal fin).

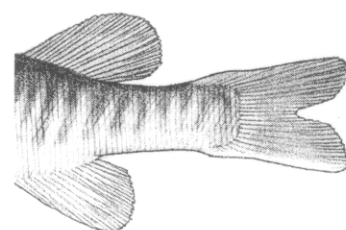
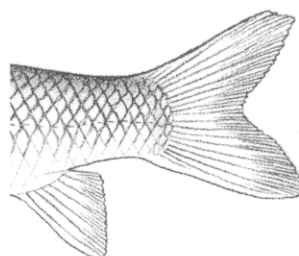
Go to **I.**

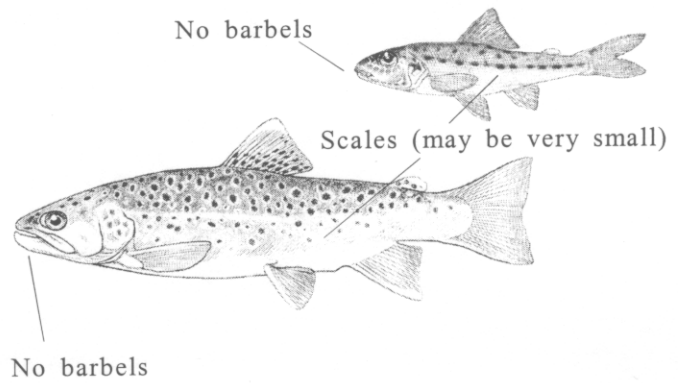


- H'.** No adipose fin.

Go to **K.**

Adipose fin
absent



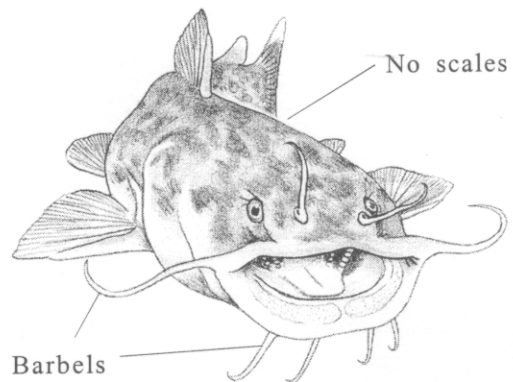


- I. Scales present, chin barbels absent.

Go to J.

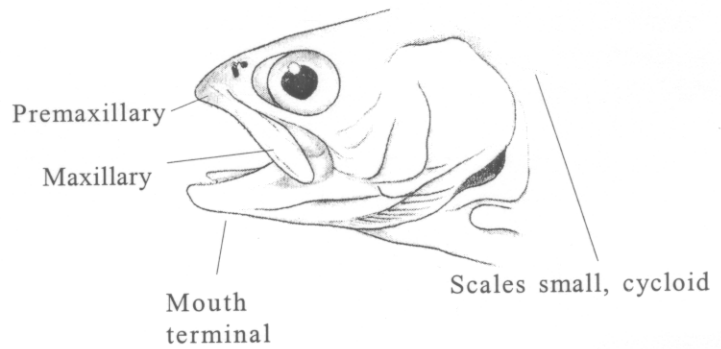
- I'. Scales absent, 8 barbels present around mouth.

Ictaluridae
Catfishes, p. 22



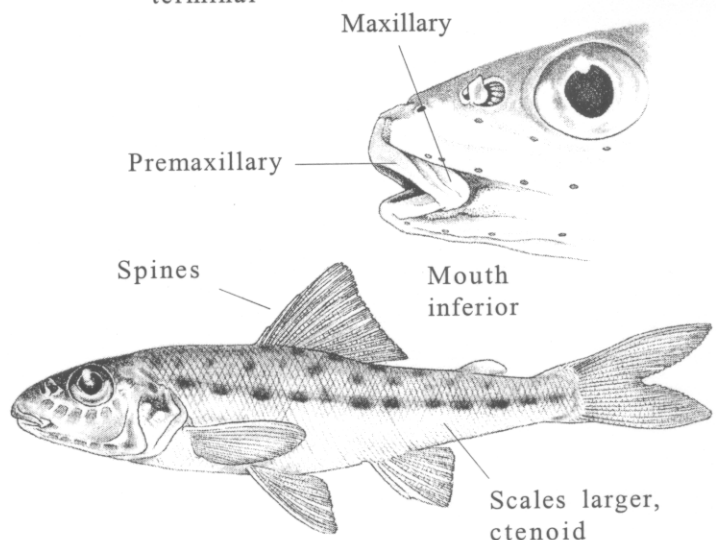
- J. Edge of the upper jaw formed by two bones, the premaxillary anteriorly and the maxillary posteriorly. No fin spines, mouth terminal. Scales small, more than 80 in lateral line, pelvic axillary process present, teeth small.

Salmonidae
Trout/Salmon, p. 26



- J'. Edge of the upper jaw formed by a single bone, the premaxillary. Maxilla not extending as far back as eye. Scales weakly ctenoid, feeling rough when rubbed from rear forward. Dorsal fin with two true spines anteriorly, mouth inferior. Pectoral fins extend posterior to pelvic fin base. Lateral line scales 43-60; dorsal fin (I) II (III), (9) 10-11; anal fin I, (5) 6-7 (8); pelvic fin I, 8-9; pectoral rays (12) 13-14 (15). Rare. Only Maryland records from C&O Canal near Washington, D.C. (Potomac Basin).

Percopsidae
Percopsis omiscomaycus, trout-perch

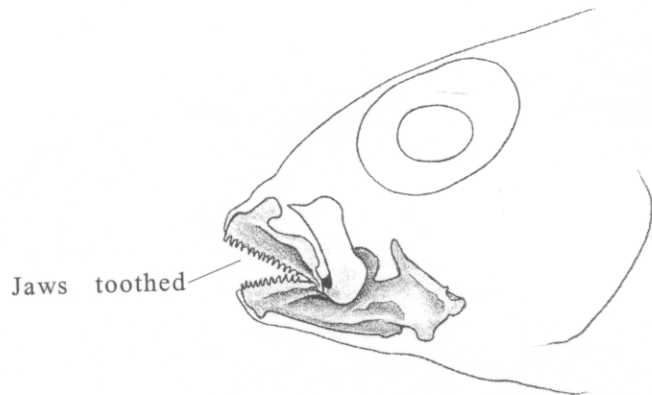
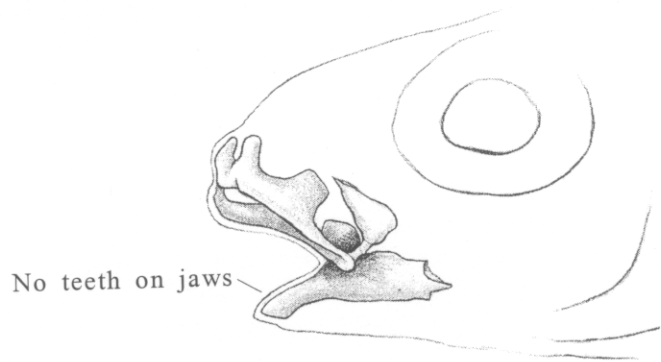


K. Mouth without teeth on the jawbones.

Go to L.

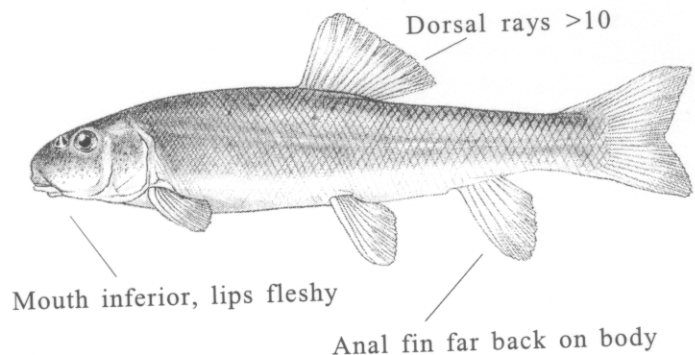
K'. Mouth with teeth on jaw bones (sometimes teeth small but can be detected by scraping along the edge of the jaw).

Go to M.



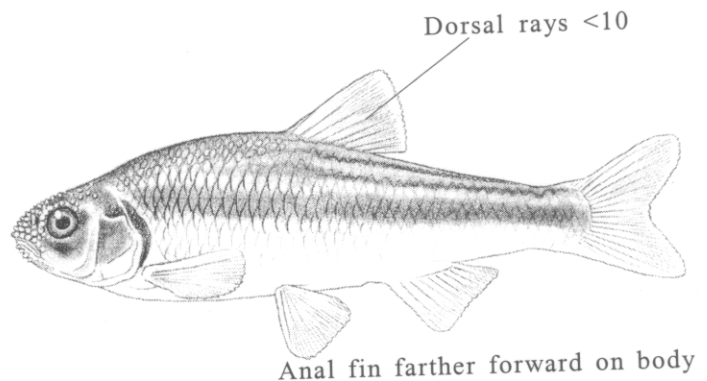
L. Mouth usually inferior with thick papillose or plicate lips. Dorsal rays 10 or more. Anal fin well back, the distance from its origin to the middle of the caudal base usually less than 1/2 the distance from the anal fin origin to the middle of the gill opening.

Catostomidae
Suckers, p. 28



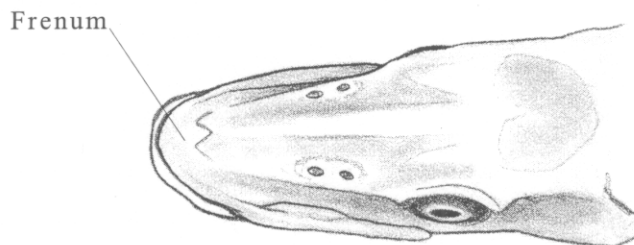
L'. Mouth variable in position, lips usually thin and not papillose or plicate. Dorsal rays usually less than 10, typically 8; if >10, first ray spinelike and serrated. With the exception of grass carp, anal fin farther forward, the distance from its origin to the middle of the caudal base greater than 1/2 the distance from the origin forward to the middle of the gill opening.

Cyprinidae
Minnows, p. 32



M. Premaxillary not protractile.

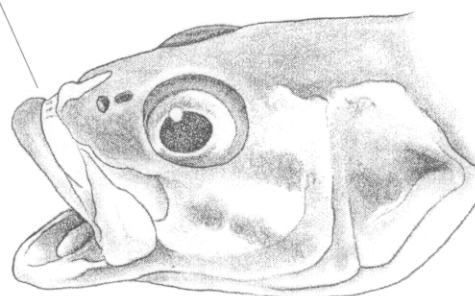
Go to N.



M'. Premaxillary protractile, a groove between the upper lip and the tip of the snout.

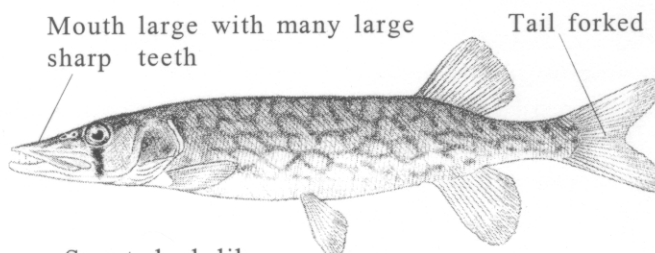
Go to O.

No frenum, premaxillary can extend anteriorly



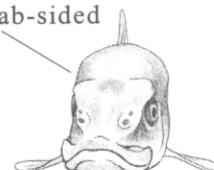
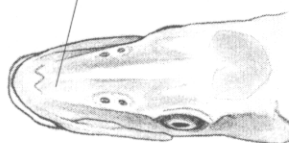
N. Mouth large, snout length about equal to or greater than postorbital head length, broad and flat with pointed or blade-like teeth of various sizes. Body elongate but slab-sided, somewhat rectangular in cross-section. Tail slightly forked, size may be large.

Esocidae
Pikes, p. 47



Snout duck-like

Body slab-sided



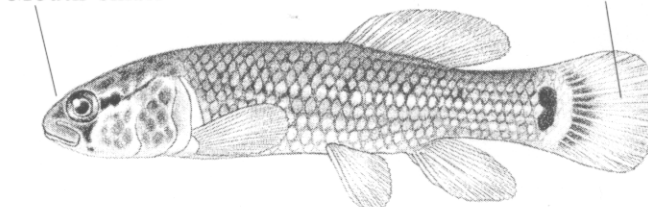
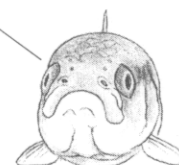
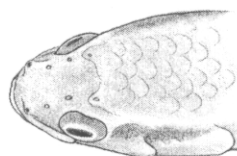
N'. Mouth relatively small, snout shorter than postorbital head length, snout not broad and flat. Body round in cross-section. Tail rounded. Prominent dark bar across base of caudal fin, about 12 longitudinal streaks on body. Midlateral scales 30-34; dorsal rays 13-15; anal rays 9-10; pelvic rays 6; pectoral rays 13-16. Coastal Plain; localized in Piedmont.

Umbridae
***Umbrapygmaea*, Eastern mudminnow**

Body round in cross-section

Mouth small

Tail rounded



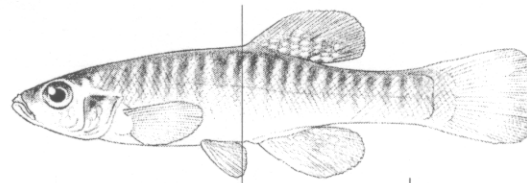
- O. Origin of dorsal fin anterior to origin of anal fin.

Go to P.

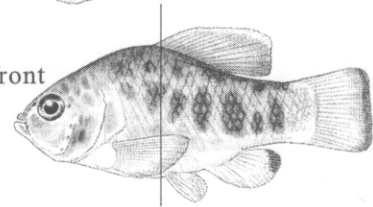
- O'. Origin of dorsal fin behind anal fin origin. Males much smaller, with the anterior rays of the anal fin modified into an intromittent organ. Females with a dark spot over the vent; without an oviducal sheath; usually containing embryos in various stages of development. Third ray of anal fin not branched. Midlateral scales (26) 29-30 (31); dorsal rays 7; anal rays 8 (9); pelvic rays (5) 6; pectoral rays 12-13 (14).

Poeciliidae

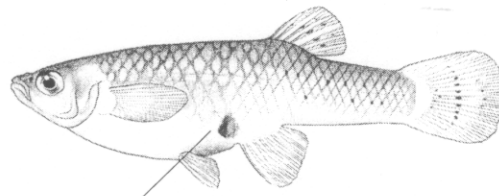
Gambusia holbrooki,
Eastern mosquitofish



Dorsal fin origin in front
of anal fin origin



Dorsal fin origin
behind anal fin origin



Female with dark spot
above vent

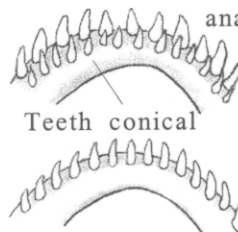


Male with gonopodium

- P. Teeth without cusps, single-pointed and conical. Females with a fleshy oviducal sheath around the anterior rays of the anal fin. Teeth with single points.

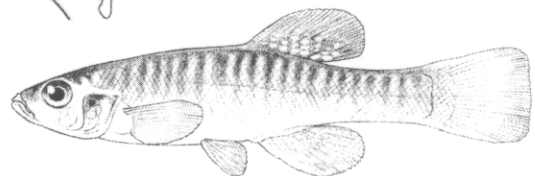
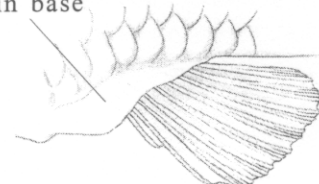
Fundulidae

Killifishes, p. 49



Teeth conical

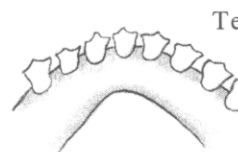
Females with fleshy sheath over
anal fin base



- P'. Teeth notched, forming 3 cusps, incisor-like. Extremely deep-bodied (depth at least twice into standard length). Near tidewater in Chesapeake Bay tributaries, historically abundant.

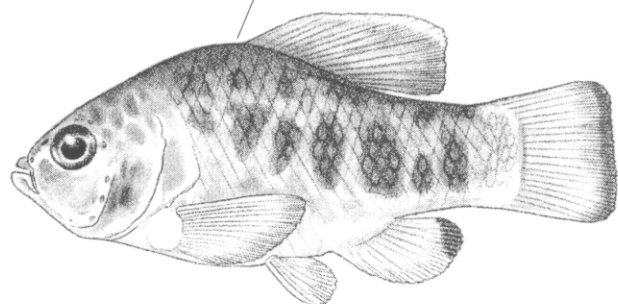
Cyprinodontidae

Cyprinodon variegatus,
sheepshead minnow



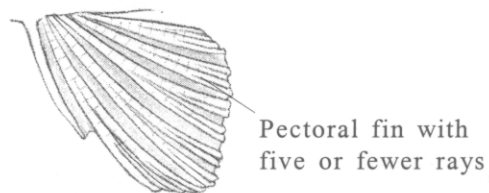
Teeth tricuspid

Deep-bodied



- Q.** Pelvic fins with one spine and five or fewer soft rays. Anus immediately anterior to the anal fin.

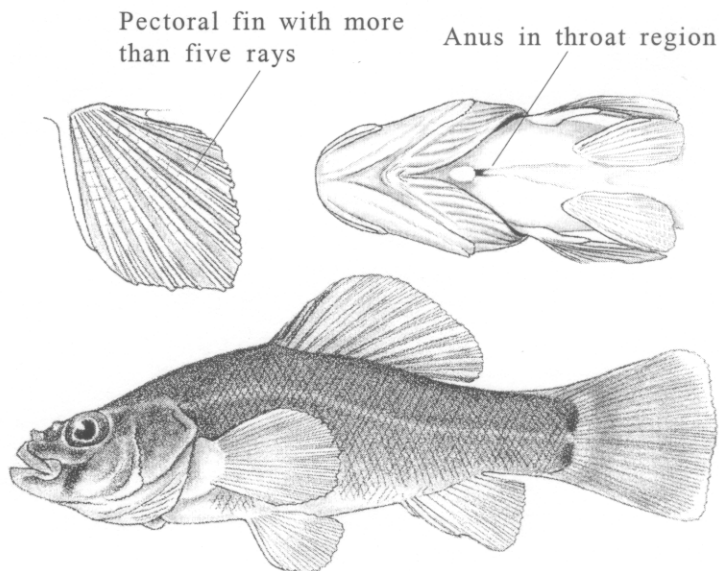
Go to **R.**



- Q'.** Pelvic fins each with more than five soft rays. Anus well forward, in the throat region in adults, near or between the pelvic fins in individuals less than 25 mm. Scales ctenoid. Anterior nostrils tubular; many series of ridges on head bear superficial neuromasts. Adults often with purplish hue. Lower Piedmont and Coastal Plain.

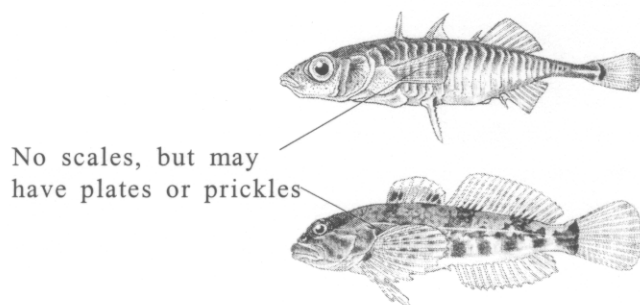
Aphredoderidae

Aphredoderus sayanus, pirate perch



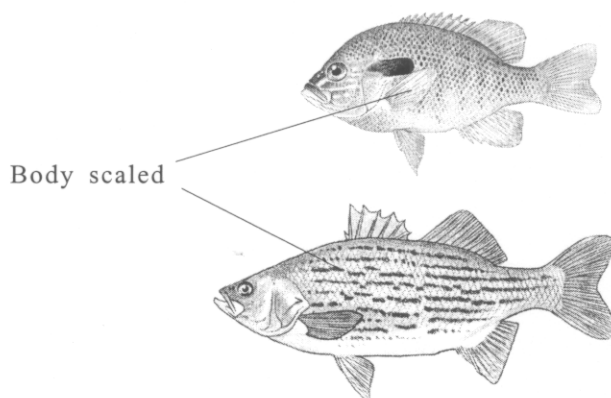
- R.** Body without scales, but may have large bony plates laterally, or small dermal prickles.

Go to **S.**



- R'.** Body with scales.

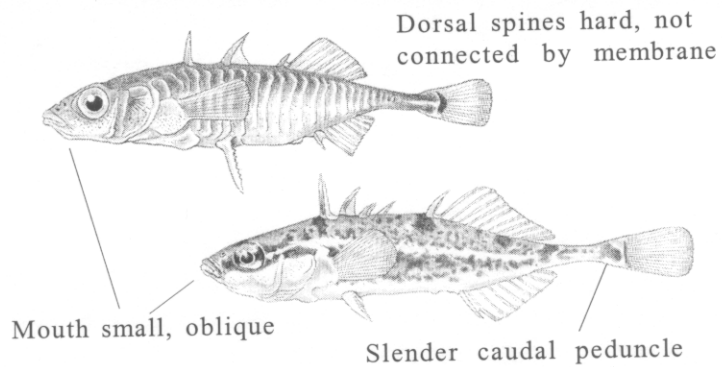
Go to **T.**



S.

Dorsal fin with three or four hard spines not connected by membranes. Pelvic fins with strong spine which is much longer than any of the rays. Caudal peduncle very slender. Mouth small and oblique.

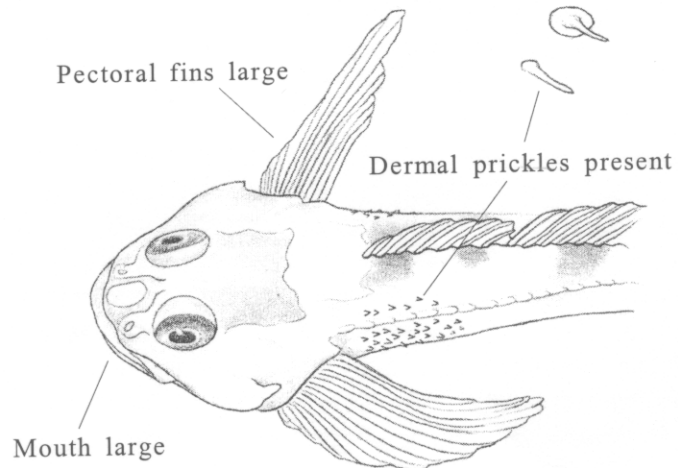
Gasterosteidae
Sticklebacks, p. 51



S'.

Dorsal spines soft and flexible, connected by membrane. Caudal peduncle moderate in depth. Pectoral fins large, mouth very large. Body naked except for minute prickles which are usually restricted to the area behind the pectoral fin base.

Cottidae
Sculpins, p. 52



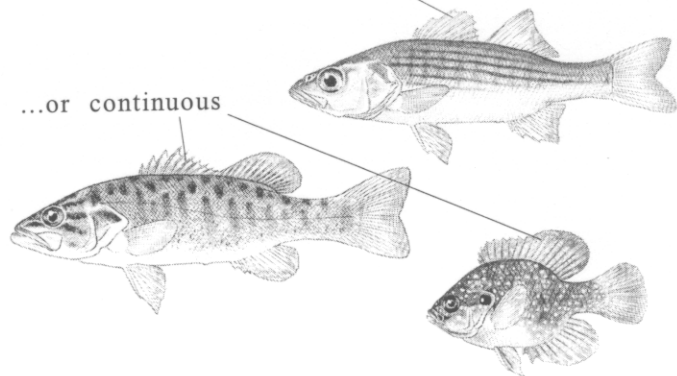
T.

Dorsal fin with the spiny and soft parts continuous or so close together that the space between them is less than the length of the base of the spiny portion of the dorsal. Anal fin base shorter than dorsal fin bases.

Go to U.

Dorsal fins slightly separate...

...or continuous

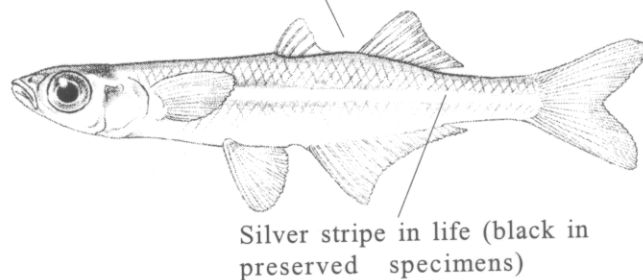


T'.

Dorsal fins well separated, space more than the length of the spiny dorsal base. Spinous dorsal small, with slender flexible spines, body with a distinct silvery lateral stripe. Length of anal fin base much longer than dorsal fin bases.

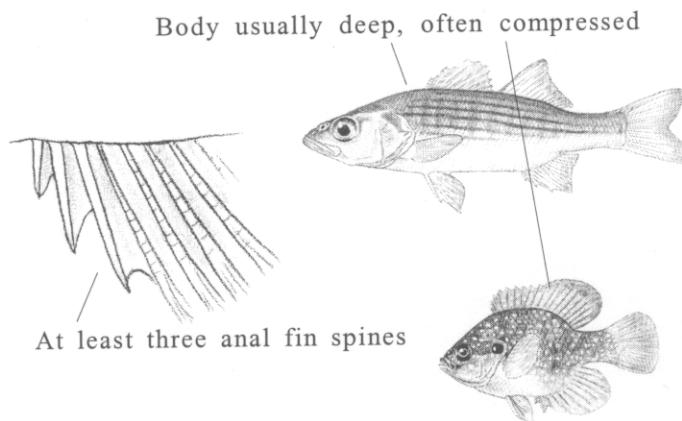
Atherinidae
Silversides, p. 54

Dorsal fins well-separated



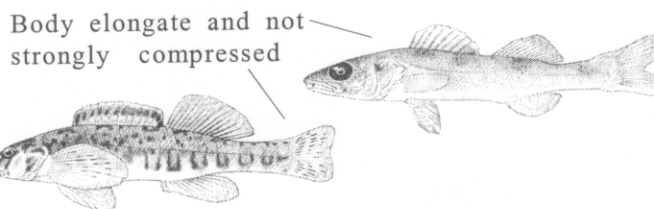
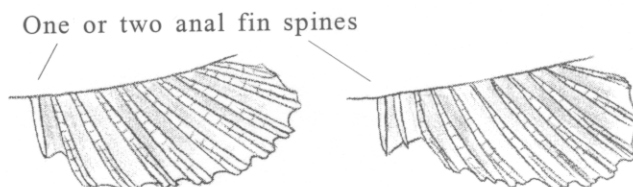
- U. Typically-three or more anal spines (never less than 2).

Go to V.



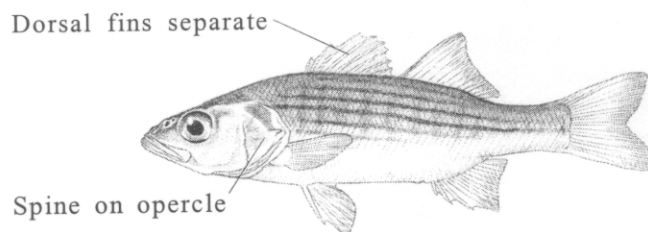
- U'. One or two anal spines.

Percidae
Perches, p. 55



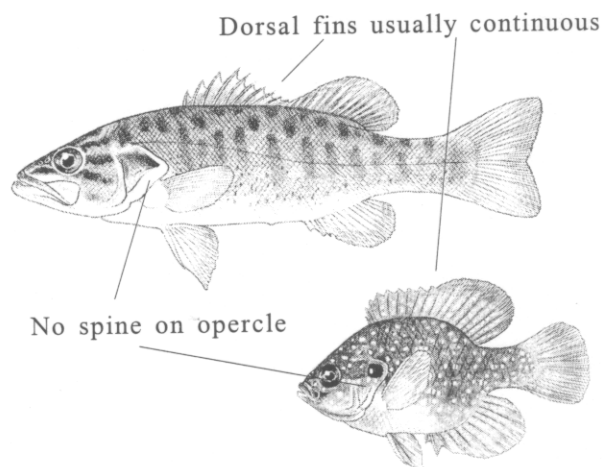
- V. Dorsal fins nearly or completely separated, longest soft ray near the anterior portion of the fin. Pseudobranchium well developed. Body color silvery, may have narrow, dark, longitudinal lines or vertical bars or both. Spine on opercle.

Moronidae
Temperate basses, p. 62



- V'. Dorsal fins continuous but may have deep notch between them. Longest soft rays towards the middle of the fin. Pseudobranchium small and covered with membrane or absent. No spine on opercle.

Centrarchidae
Sunfishes, p. 63



KEY TO THE LAMPREYS

The three species of lamprey known to Maryland have distinctive dorsal fins. One species, *Petromyzon marinus*, is parasitic as an adult and may exceed 700 mm in length. The two *Lampetra* species are not parasitic and do not exceed 275 mm in length, even as adults.

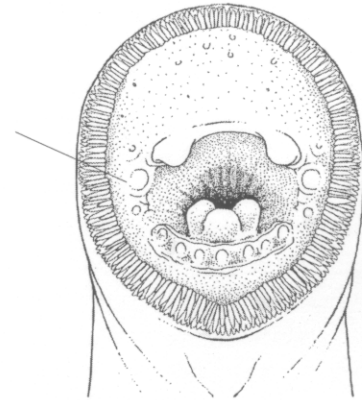
- A. Myomeres more than 60 between the 7th gill opening and the anus, prebranchial blotch absent in ammocoetes.

Go to B.

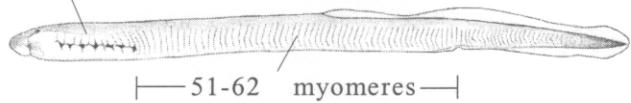
- A'. Myomeres 51-62 (usually 52 to 59) between the 7th gill opening and the anus.
Ammocoetes: Prebranchial blotch present, dark pigment on caudal fin restricted to thin area along body. **Adults:** Length 70 to 150 mm at maturity, teeth other than marginals visibly absent from posterior field of oral disk.

Lampetra aepyptera, least brook lamprey

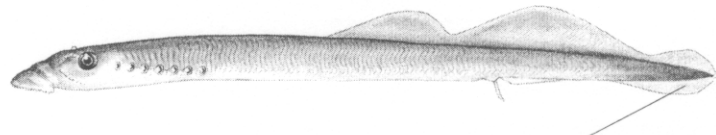
Teeth rudimentary in adults



Pale area above gill openings wider



51-62 myomeres

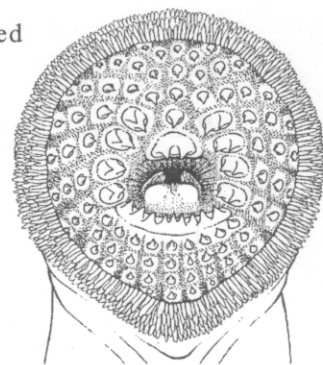


Tail membranes lighter than tail

- B. Myomeres 65 to 76. In specimens 60 mm TL or more, tail well rounded, with upper outline not distinctly elevated. Caudal fin pigmentation also beaver tail shaped, often evenly distributed and extending nearly to outer edges of fin in some specimens. Caudal fin melanophores numerous, never jet black and always individually distinguishable. Caudal peduncle well pigmented on ventral edge. Pigmentation in upper branchial region extending downward from back nearly to branchial groove, leaving only narrow pale area above gill openings (e.g., distance about equal to width of 1st myomere); suborbital area and lower half of lateral portion of oral hood largely pigmented. Transformation to adults occurs around 130 mm. **Adults:** Parasitic, mouth lined with two pronged, circumoral teeth in curved, radiating rows. Size of adults large, some in excess of 700 mm.

Petromyzon marinus, sea lamprey

Many well-developed rows of teeth in adults



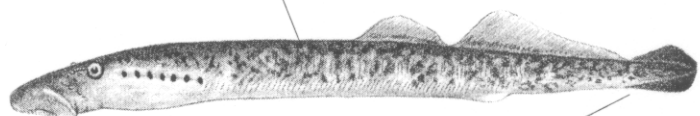
Pale area above gill openings narrow



65-76 myomeres



Adults strongly mottled, large



"Beaver-tailed"

B'.

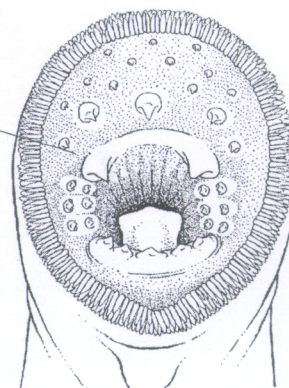
Myomeres 63 to 75 (usually 63 to 70).

Ammocoetes: Tail bluntly pointed, upper outline of tail distinctly elevated. Caudal fin melanophores large and very dark, restricted to membrane near body and also not creating an overall shape like a beaver tail. Lower edge of caudal peduncle unpigmented. Pigmentation in upper branchial region extending downward from back to approximately two myomere widths away from branchial groove, i.e., about halfway from the dorsal midline to the gill openings. Upper lip and the region below the eye devoid of pigment. **Adults:** Length at maturity 90 to 270 mm, teeth other than marginals visibly present in clusters in posterior field of oral disk.

Lampetra appendix,

American brook lamprey

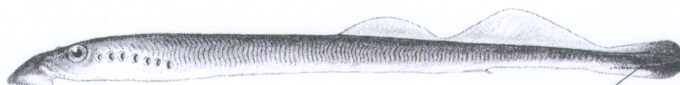
Teeth weakly developed in adults



Pale area above gill openings wider



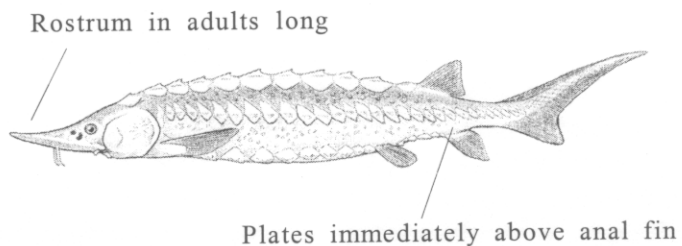
— 63-75 myomeres —



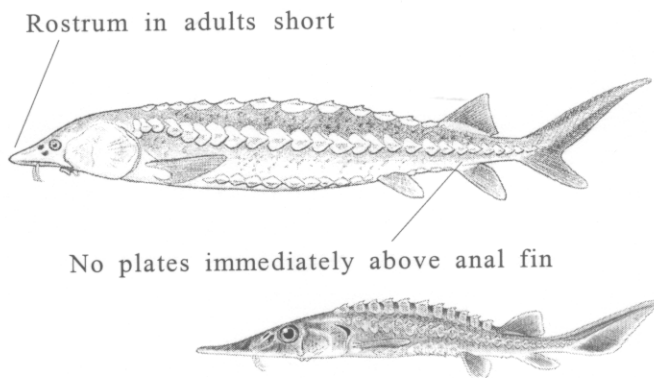
Tail membranes dark

KEY TO THE STURGEONS

- A. Mouth small, 43-66% of interorbital width. Rostrum in adults long and pointed. Peritoneum pale. From 2-6 small bony plates between anal fin base and lateral row of scutes. Size large, formerly to at least 4.2m in length.
Acipenser oxyrinchus, Atlantic sturgeon



- A'. Mouth large, gape width from 63-81% of interorbital width. Rostrum in adults short and blunt. Peritoneum dark. No bony plates between base of anal fin and lateral row of scutes. Maximum size to about 1.5m in length.
Acipenser brevirostrum, shortnose sturgeon



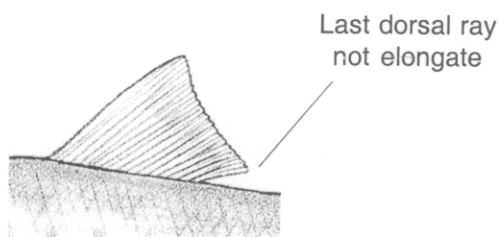
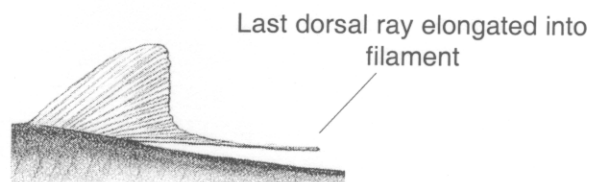
KEY TO THE HERRINGS

- A.** Last ray of dorsal fin prolonged into a filament. Midline of back, in front of the dorsal fin, not covered with scales. Stomach thick and gizzard-like.

Go to **B.**

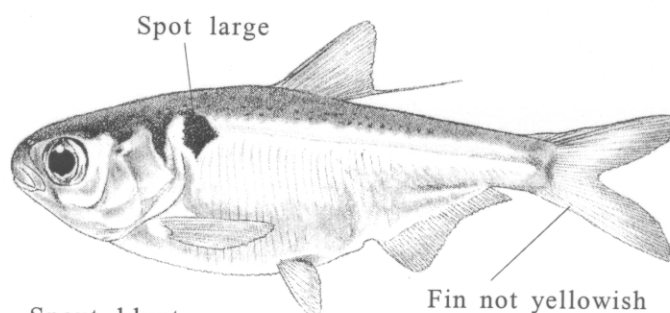
- A'.** Last dorsal ray not elongated. Predorsal midline covered with scales. Stomach not gizzard-like.

Go to **C.**



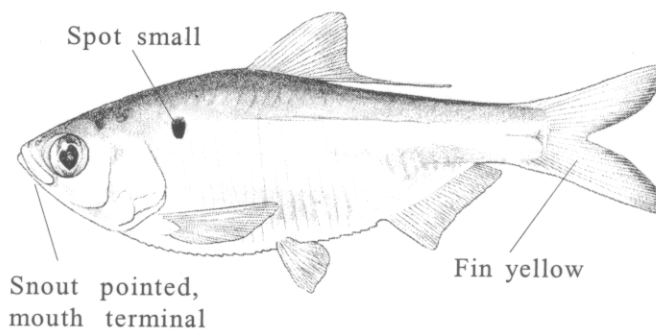
- B.** Anal fin rays (25) 29-35 (37). Snout overhanging lower jaw. Origin of dorsal fin posterior to base of pelvic fins. Dark spot behind opercle at least as large as eye diameter. Lateral line scales 52-70; dorsal rays 10-15; pelvic rays 7-10; gill rakers on lower limb of first arch, 90 in young to 350 in adult.

Dorosoma cepedianum, gizzard shad



- B'.** Anal fin rays (17) 20-25 (27). Lower jaw anterior to snout tip. Origin of dorsal fin over or slightly anterior to base of pelvic fins. Dark spot behind opercle smaller than eye diameter. Lateral line scales 41-48; dorsal rays 11-14; pelvic rays 7-8; pectoral rays 12-17; gill rakers on lower limb of first arch, up to 412 in adults. Caudal fin yellowish.

Dorosoma petenense, threadfin shad



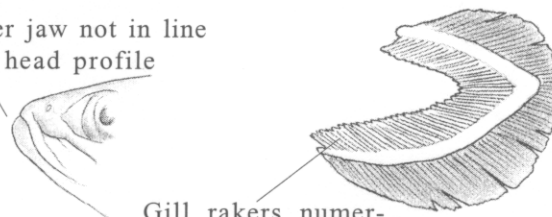
- C. Lower jaw only slightly longer than the upper, not forming a continuation of the dorsal profile. Gill rakers closely spaced, 26 or more on the lower limb of the first arch.

Go to D.

- C'. Lower jaw extending well beyond the tip of the upper jaw, forming a continuation of the dorsal profile when the mouth is closed. Gill rakers widely spaced, 18-23 on the lower limb of the first arch. Meeting of the premaxillae forming a shallow notch (obtuse angle). Adults with row of spots behind opercle. Midlateral scales 45-50; dorsal rays 15-20; anal rays 19-23; pelvic rays 9, pectoral rays 15-16.

Alosa mediocris, hickory shad

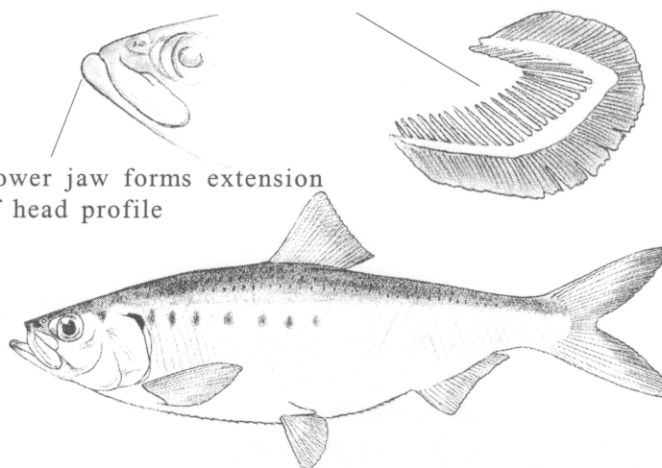
Lower jaw not in line with head profile



Gill rakers numerous, closely-set, >26 on lower limb

Gill rakers widely spaced, >23 on lower limb

Lower jaw forms extension of head profile



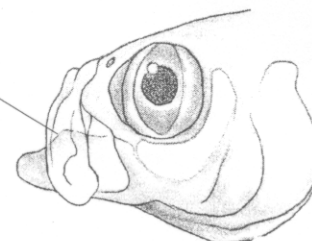
- D. Lower jaw wide, its upper margin strongly curved. Silvery patch on cheek longer than deep. Maxillary short, reaching only to below middle of the eye when the mouth is closed.

Go to E.

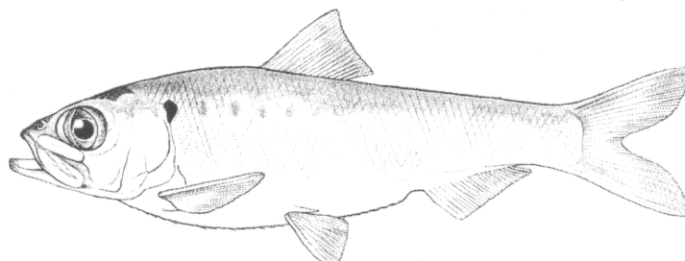
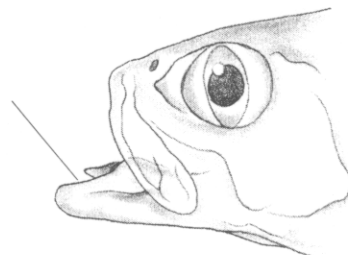
- D'. Lower jaw slender, its upper margin only slightly curved. Silvery patch on cheek much deeper than long (wide). Maxillary extending to below the posterior edge of the pupil of the eye in adults when mouth is closed. Gill rakers increase with age, 26-43 in small fish and 59-76 in specimens more than 125 mm. Dorsal margin of mandible only slightly curved, profile horizontal (must open mouth to see). Adults with row of spots behind opercle. Midlateral scales 52-64, dorsal rays (15) 16-18 (19); anal rays (17) 19-21 (23); pelvic rays (8) 9 (10); pectoral rays (15) 16-17 (20).

Alosa sapidissima, American shad

Upper margin of lower jaw rises abruptly



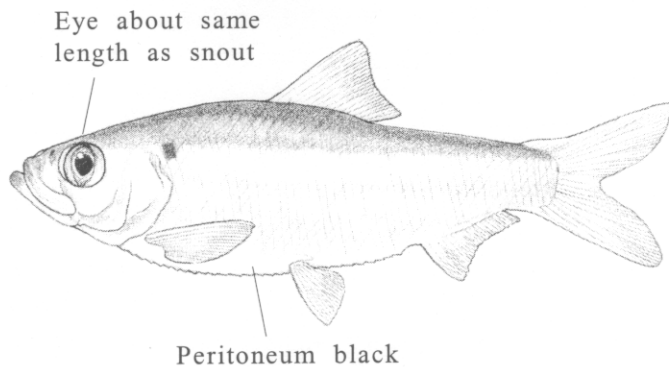
Upper margin of lower jaw rises gradually



E.

Diameter of eye about equal to length of snout in fish more than 150 mm total length. Peritoneum black. Gill rakers (41) 44-50 (52) on lower limb of first arch. Lateral line scales 46-54; dorsal rays (15) 16-17 (19); anal rays (16) 17-18 (21); pelvic rays (8) 9 (10); pectoral rays (12) 14-16 (17).

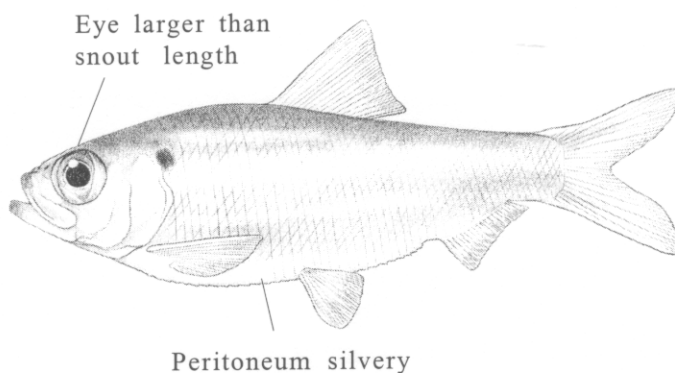
Alosa aestivalis, blueback herring



E'.

Diameter of eye greater than length of snout in adults. Peritoneum pale or silvery with dusky spots. Gill rakers (38) 39-41 (46) on lower limb of first arch. Lateral line scales 42-54; dorsal rays (15) 16-18 (19); anal rays (15) 17-19 (21); pelvic rays (7) 9 (10); pectoral rays (12) 14-15 (16).

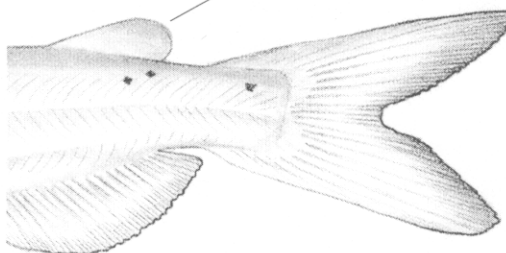
Alosa pseudoharengus, alewife



KEY TO THE CATFISHES

- A.** Adipose fin flag-like, distinctly separated from caudal fin by a short space and separate from the caudal peduncle posteriorad.

Adipose fin flag-like

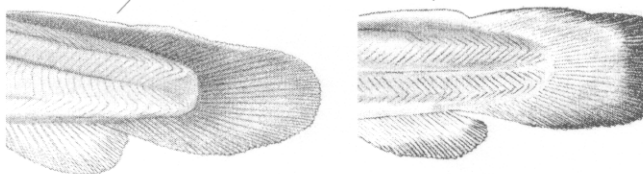


Go to **B.**

- A'.** Adipose fin a low, keel-like ridge, separated from the caudal fin by a shallow notch and attached to the caudal peduncle posteriorad.

Go to **G.**

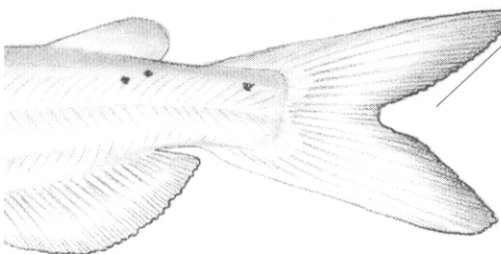
Adipose fin attached posteriorly to caudal peduncle



- B.** Tail definitely forked.

Go to **C.**

Tail forked

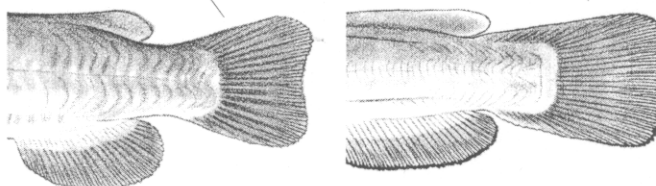


- B'.** Tail rounded, square, or slightly lunate but never definitely forked. Bony ridge between skull and dorsal fin with a gap that can be felt through the skin.

Go to **E.**

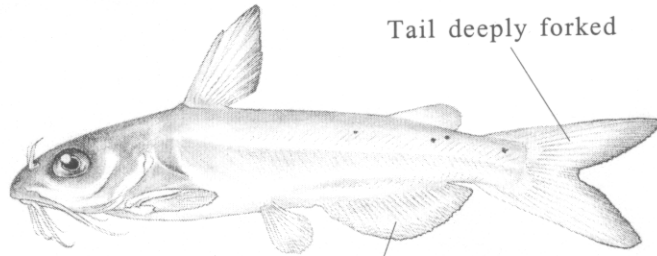
Tail slightly lunate

Tail rounded



- C. Tail deeply forked, the shortest rays less than half the longest upper rays (less so in large individuals). Anal rays 26-35.

Go to D.

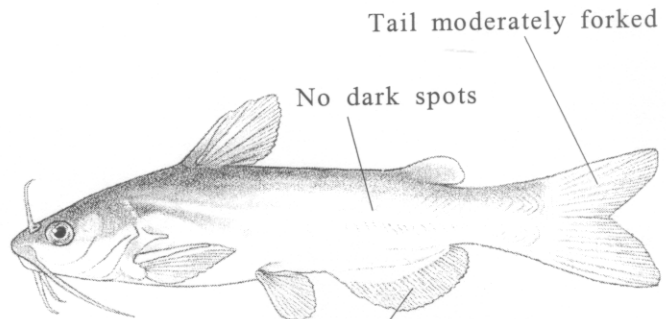


Tail deeply forked

More than 25 anal fin rays

- C'. Tail moderately forked, the shortest rays about three-fourths the length of the longest upper rays. Anal rays, including rudiments, (19) 22-24 (25). Color blue gray above, white below, never with conspicuous round spots. Dorsal fin I, 5-7; pelvic rays 8; pectoral fin I, 8-9; gill rakers on lower limb of first arch 18-21 (23). This species has been taken above Brunswick, MD.

Ameiurus catus, white catfish



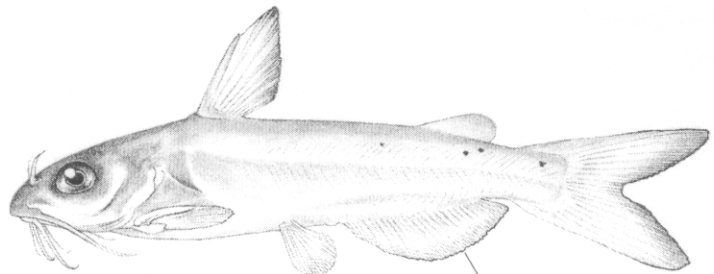
Tail moderately forked

No dark spots

Less than 25 anal fin rays

- D. Anal fin distinctly rounded along distal margin, anal rays (23) 25-30 (32). Young often with definite round black spots on sides. Pelvic rays 8; pectoral fin I, 8-9; gill rakers on lower limb of first arch 13-15 (18).

Ictalurus punctatus, channel catfish

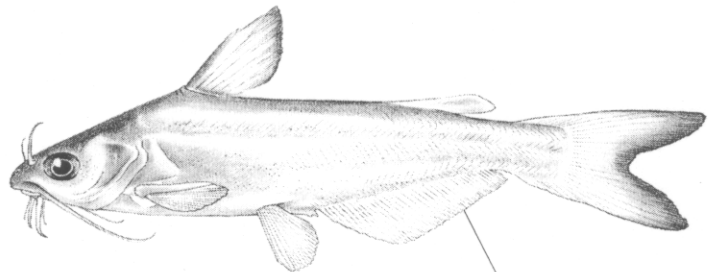


Anal fin with rounded margin

- D'. Anal rays (27) 30-36 (38), anal fin relatively straight along distal margin. Dorsal fin I, 6; pelvic rays 8; pectoral fin I, 8-9; gill rakers on lower limb of first arch 14-21.

Introduced into Potomac Basin.

Ictalurus furcatus, blue catfish

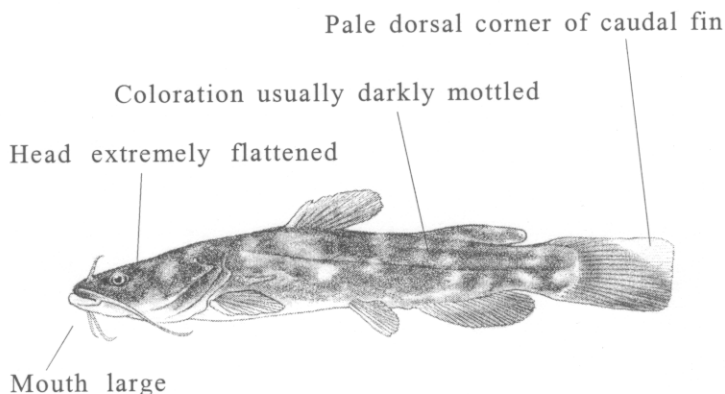


Anal fin with nearly straight margin

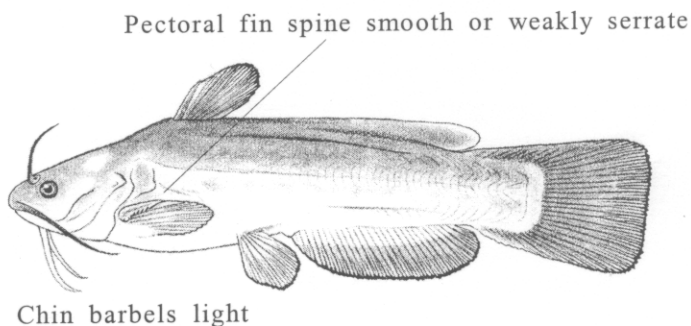
- E. Head robust, not dorsolaterally flattened; adult size generally less than 30cm.

Go to F.

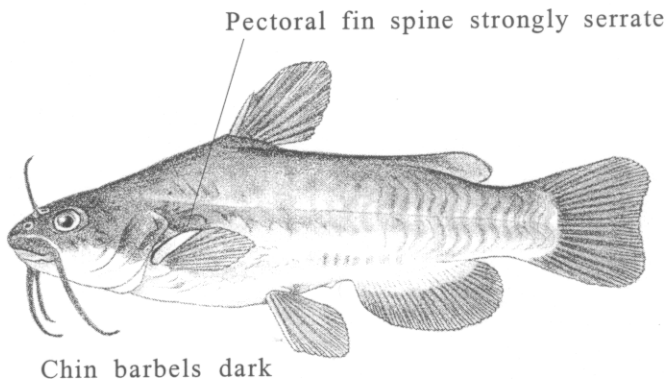
- E'. Head large and strongly depressiform; size to 1.5m; caudal fin with distinct dorso-posterior pale margin; color dark and usually strongly mottled. Introduced into the lower Potomac Basin and Susquehanna River.
***Pylodictis olivaris*, flathead catfish**



- F. Anal rays 24-27 (28). Chin barbels predominantly white. Caudal square or rounded. Pectoral spines usually smooth. Dorsal fin I, 6; pelvic rays 8; pectoral fin I, 7-8; gill rakers on lower limb of first arch (12) 13-16 (18).
***Ameiurus natalis*, yellow bullhead**



- F'. Anal rays 17 to 25. Chin barbels gray or black. Caudal square or slightly emarginate. Adult pectoral spines with relatively strong posterior serrations (less so in juveniles). Gill rakers on lower limb of first arch (12) 13-15 (16), caudal fin base uniformly dusky or dark in large juvenile and adult. Anal rays (18) 20-24. Jaws of almost equal length. Dorsal fin I, 6 (7); pelvic rays 8; pectoral fin I, (7) 8 (9). Membranes of median fins dusky.
***Ameiurus nebulosus*, brown bullhead**

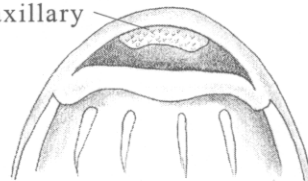


- G. Premaxillary tooth patches rectangular, without posterolateral process. Skull only moderately flat.

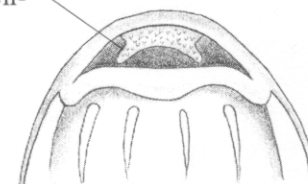
Go to H.

- G'. Premaxillary tooth patches with a curved process extending backward from their posterolateral corners. Skull very flat. Posterior edge of dorsal spine smooth. Depigmented areas present on nape and behind dorsal fin. Dorsal fin I, (5) 6; anal rays 15-18 (19); pelvic rays (8) 9-10; pectoral fin I, 9-11. Casselman River; a few individuals reintroduced to Youghiogheny River at Sang Run.
Noturus flavus, stonecat

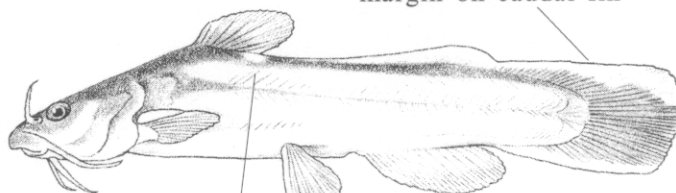
Tooth patch on premaxillary bone rectangular



Tooth patch on premaxillary with posterolateral extensions



Pale cream or orangish margin on caudal fin

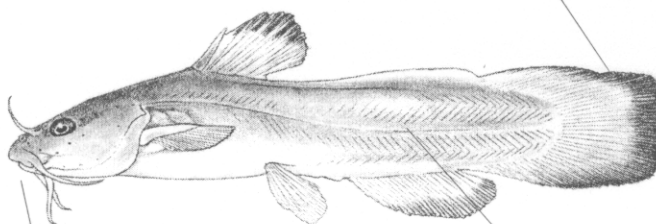


Pale area on back

- H. Mouth distinctly subterminal, body elongate and slender. Unpaired fins with dark margins. Procurrent caudal rays only moderately developed. Posterior edge of dorsal spine strongly serrated, anterior weakly serrated. Depigmented areas on nape and behind dorsal fin. Dorsal fin I, (5) 6; anal rays (15) 17-19 (21); pelvic rays (8) 9-10; pectoral fin I, (7) 8-9 (10).

Noturus insignis, margined madtom

Usually dark margins on median fins



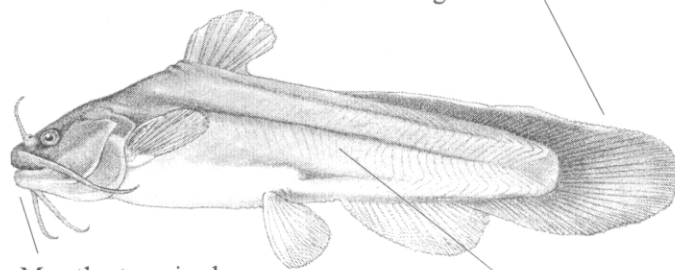
Mouth subterminal

Body slender

- H'. Mouth terminal or slightly subterminal, body short and stout. Unpaired fins without dark edges, color uniform. Procurrent caudal rays very well developed, extending forward as keels on top and bottom of caudal peduncle. Posterior edge of dorsal and pectoral spines smooth. Dorsal fin I, (5) 6; anal rays (12) 14-17 (18); pelvic rays (5) 8-9 (10); pectoral fin I, (5) 7-8 (10).

Noturus gyrinus, tadpole madtom

No dark margins on median fins



Mouth terminal

Body stout

KEY TO THE TROUT

- A. Fewer than 140 lateral line scales. Teeth in the midline roof of the mouth (vomerine teeth) in one or two rows running backward toward the throat, sometimes lost in older fish. Vomer bone without a raised crest at its anterior end. Color pattern dark marks on a lighter background. Ventral fins without a conspicuous white leading edge.

Go to B.

- A'. More than 190 lateral line scales. Teeth in midline of roof of mouth confined to a raised area at the front of the vomer bone. Color pattern light spots on a darker background.

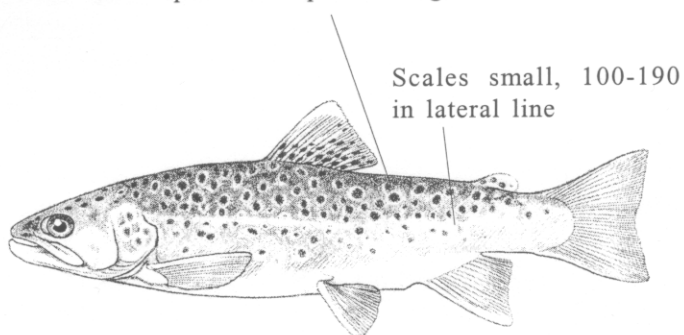
Go to D.

- B'. Caudal fin with spots; spots usually form rows.

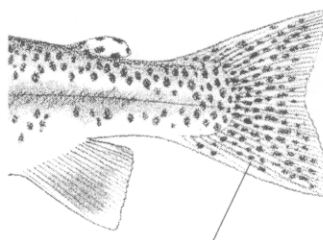
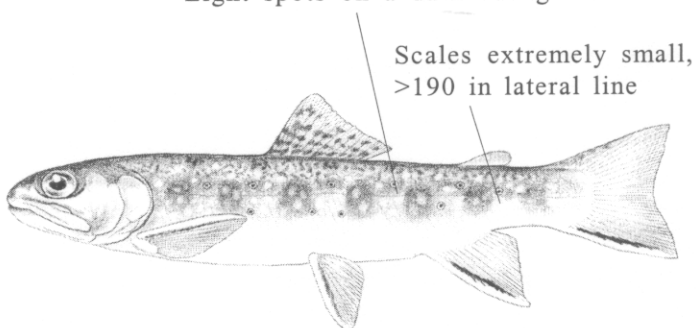
Go to C.

- B. Caudal fin without spots or with few restricted to dorsal region. Back and sides with diffuse brownish spots. Red or orange spots on sides often surrounded by pale ring. Adipose fin orange (fades in some adults), without a black margin. Dorsal fin origin much closer to tip of snout than to middle of caudal base. Pelvic fin insertion under posterior half of the dorsal fin base. Approximately 11 parr marks. Lateral line scales 100-130; dorsal rays 14-16; anal rays 10-13; pelvic rays 9-10; pectoral rays 12-15; gill rakers on lower limb of first arch 14-22.
***Salmo trutta*, brown trout**

Dark spots on a pale background



Light spots on a dark background

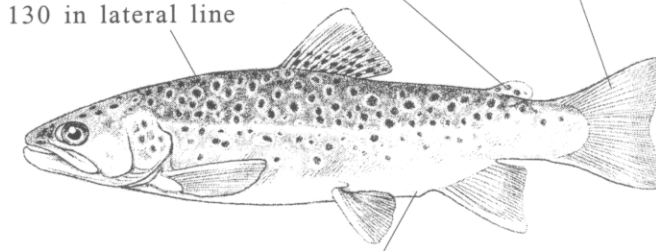


Caudal fin with rows of spots

Caudal fin with no or few spots

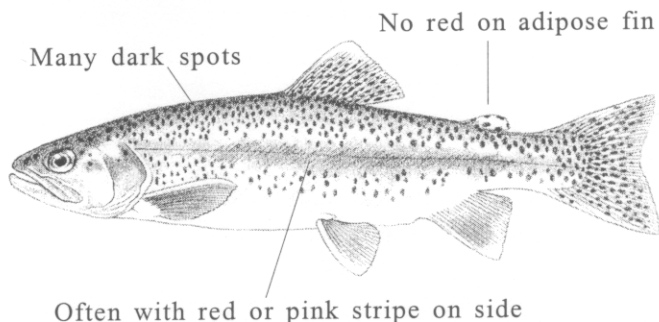
Red-orange margin on adipose fin

Scales coarse, 100-130 in lateral line

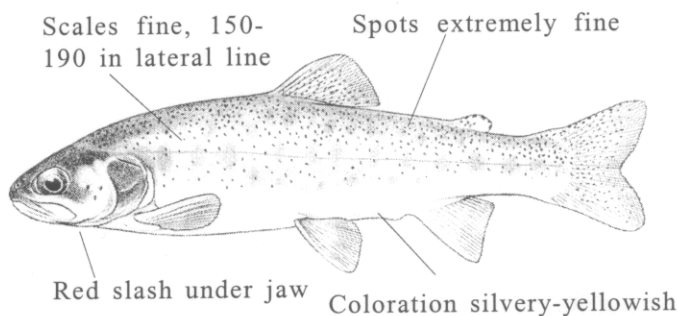


Belly and fins often yellowish

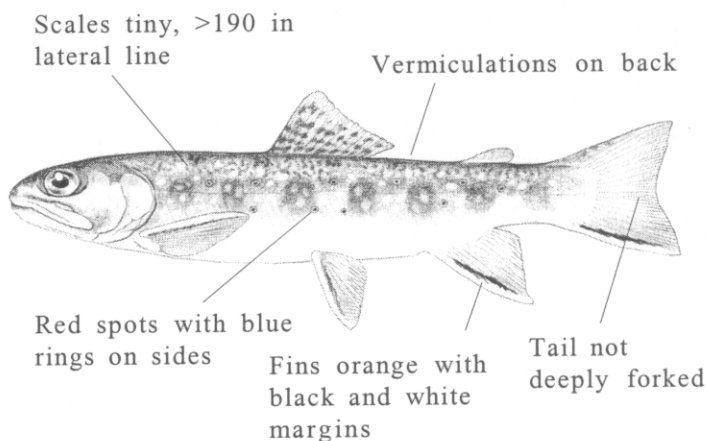
- C. Back and sides with sharply outlined spots that are also present on both lobes of the tail. Adipose fin distinctly outlined in black with a pale center. No red spots but adults may have a broad pink or red lateral band on the midsides. Hyoid teeth absent. Lateral line scales 100-150; dorsal rays (13) 15-17; anal rays (12) 14-16; pectoral rays 11-17; gill rakers on lower limb of first arch 16-22.
***Oncorhynchus mykiss*, rainbow trout**



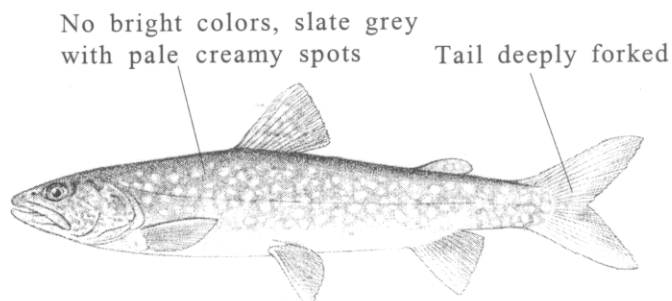
- C'. Red "cutthroat" mark under lower jaw, many black spots on body. Hyoid teeth present (small teeth behind those on the tip of tongue). Lateral line scales more than 150; dorsal rays (10) 9-11. Form in Maryland with extremely small spots, usually smaller than those in rainbow trout of same size.
***Oncorhynchus clarkii*, cutthroat trout**



- D. Pelvic and anal fins with a dark stripe behind the white leading edge. 8 or 9 parr marks, dorsal fin with dark markings. Lateral line scales 195-243; dorsal rays (12) 13-15; anal rays 12-14; pelvic rays 7-10; pectoral rays 10-15; gill rakers on lower limb of first arch 13-22.
***Salvelinus fontinalis*, brook trout**



- D'. Pelvic and anal fins without black streak behind white leading edge. Tail usually deeply forked. Introduced into Jennings Randolph Reservoir in 1986; may now be rare or absent.
***Salvelinus namaycush*, lake trout**

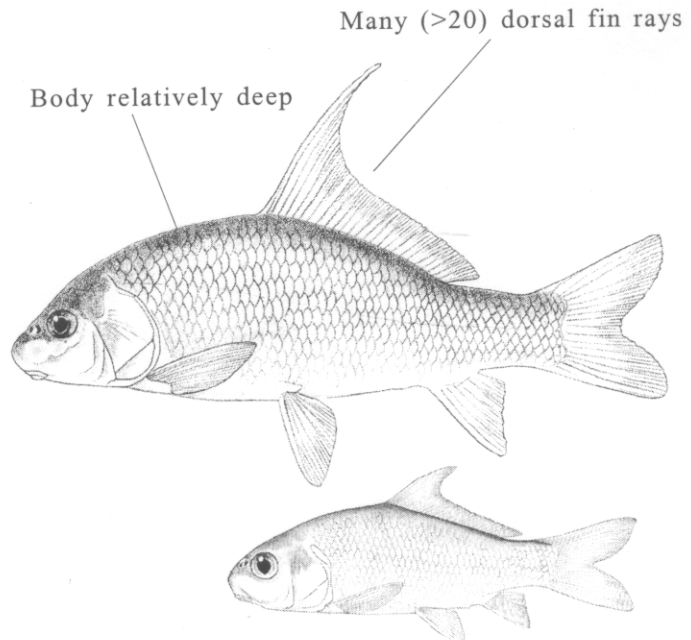
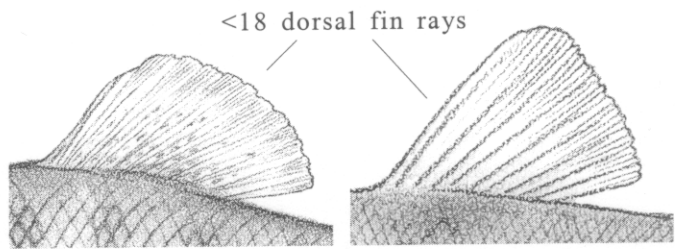


KEY TO THE SUCKERS

- A. Dorsal fin short, with fewer than 18 rays.

Go to B.

- A'. Dorsal fin long, with 26-31 (32) rays.
Dorsal fin with a high lobe in front, anterior rays reaching beyond the middle of the fin base when depressed. Mouth small and nearly horizontal, upper jaw much shorter than the length of the snout. Anal fin rays (7) 8-9; lateral line scales (33) 36-40 (42); vertebrae 38-40; pelvic rays 8-10; pectoral rays 15-16. Snout relatively long, usually contained 3 to 3.5 times in head length. Fins plain, pointed, color pale silvery.
Carpiodes cyprinus, quillback



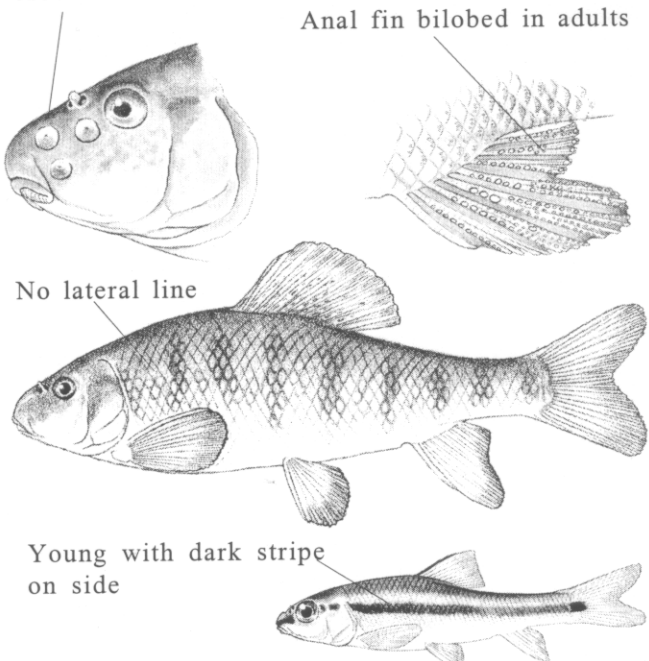
- B. Lateral line complete although it may be inconspicuous in juveniles.

Go to C.

- B'. Lateral line absent, mouth oblique. Dorsal fin rays (9) 11-12 (14); anal fin rays (6) 7-8; lateral line scales (35) 38-43 (45). Dark stripe along side continuous in young but broken into vertical bars in adults. Pelvic rays (7) 9 (10); pectoral rays (14) 15-16 (17).
Erimyzon oblongus, creek chubsucker

Nuptial males with large tubercles on head

Anal fin bilobed in adults

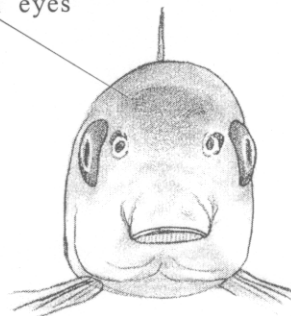


- C. Head convex between eyes, no definite dorsal saddles and lacking pale areas at base of caudal fin.

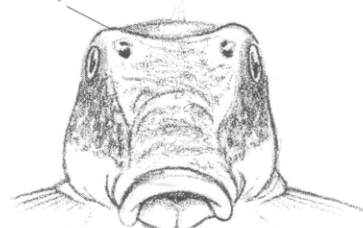
Go to D.

- C'. Orbital rims raised and head concave between eyes in individuals longer than 75 mm long, flat in smaller fish. Body conspicuously marked with prominent saddle-shaped crossbands, base of caudal fin with two pale areas. Lateral line scales (44) 45-48 (50); dorsal rays (9) 11 (12); anal rays (6) 7 (8); pelvic rays 9 (10); pectoral rays (16) 17-19. Statewide, abundant.
Hypentelium nigricans,
Northern hogsucker

Head convex between eyes

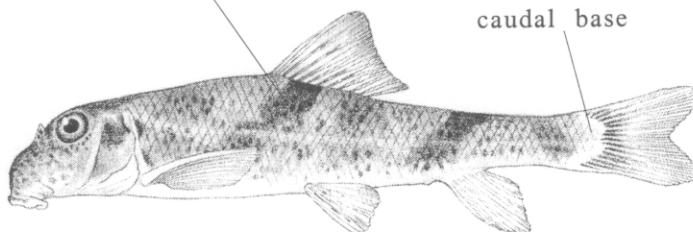


Head concave between eyes



Dorsal saddles

Pale areas at caudal base



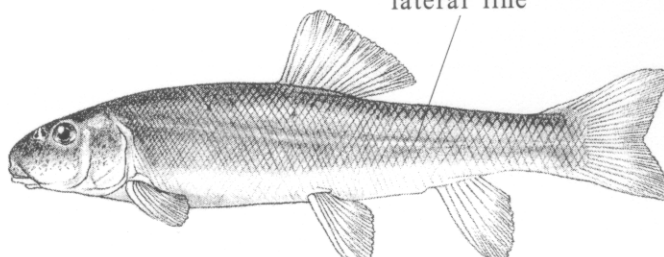
- D. Scales small, more than 52 in lateral line; anterior body scales distinctly smaller than posterior body scales. Swim bladder with 2 chambers.

Go to E.

- D'. Scales large, fewer than 50 in lateral line; all scales approximately equal in size. Swim bladder with 3 chambers, eyes near middle of head.

Go to F.

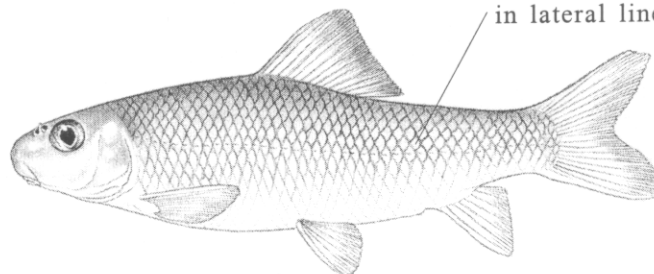
Small scales, >52 in lateral line



Gas bladder 2-chambered



Large scales, <50 in lateral line

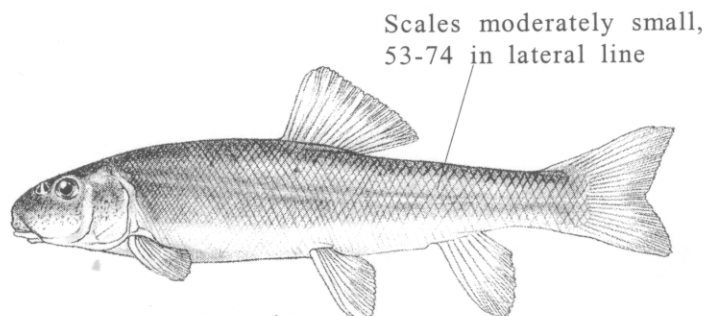


Gas bladder 3-chambered



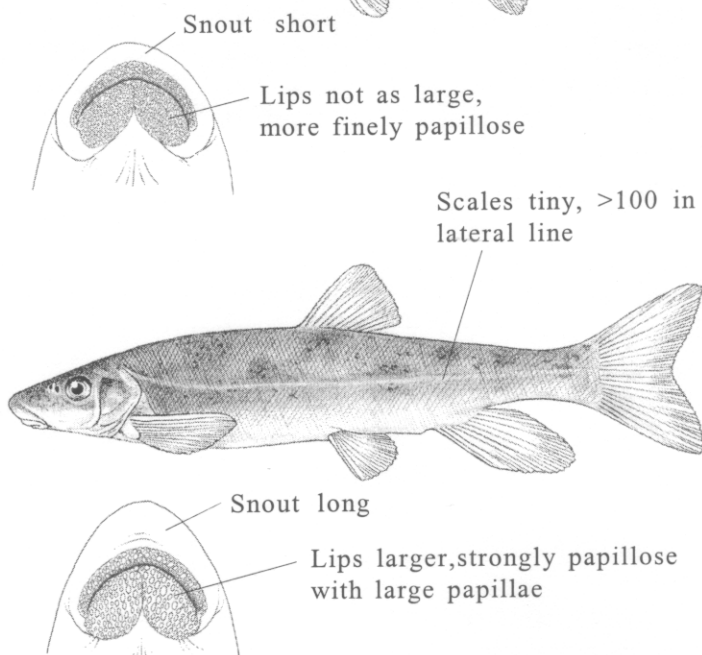
- E. Lateral line scales 53-74. Snout short, projecting only slightly beyond tip of upper lip. Scales approximately square, without radii in lateral fields. Dorsal rays (10) 11-14 (15); anal rays (6) 7-8; vertebrae 44-48; gill rakers on lower limb of first arch 20-23; pelvic rays 9-11; pectoral rays 15-18. Statewide.

Catostomus commersoni, white sucker



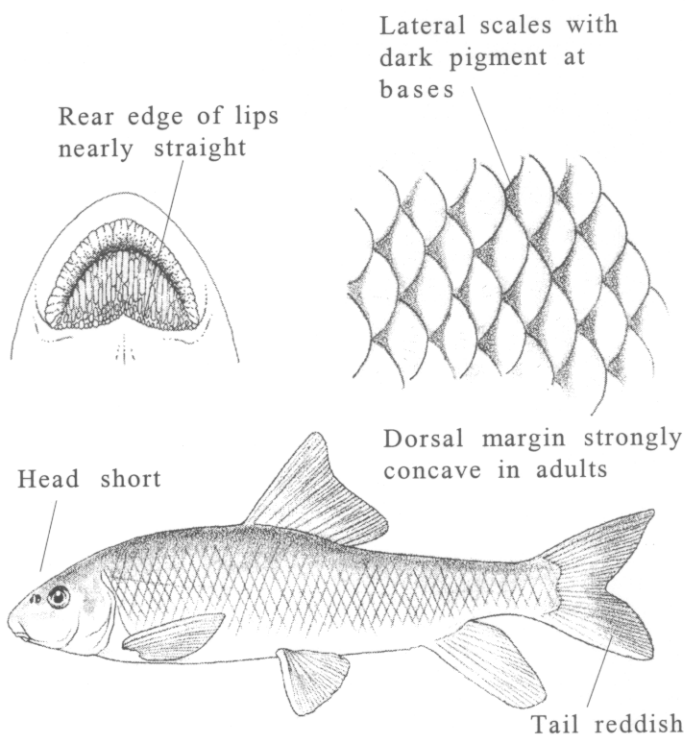
- E'. Scales very small, more than 100 in lateral line. Snout projects well beyond tip of upper lip. Scales oval-shaped with radii distributed evenly throughout. Dorsal rays 10. Youghiogheny drainage only, possibly extirpated.

Catostomus catostomus, longnose sucker



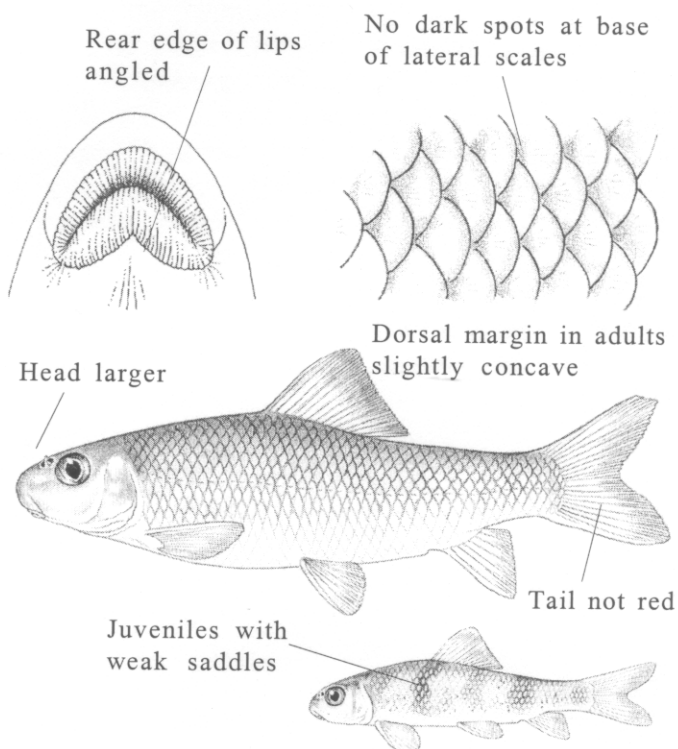
- F. Head short, 4.3 to 5.4 times in standard length. (3.5 to 4.0 in fish less than 75mm in length). Lateral scales with definite dark or dusky spots at their bases. Folds of lips broken into large oval papillae in larger individuals. Lateral line scales (39) 42-44 (46). Dorsal margin strongly concave in adults, slightly so in young. Body slender, its depth 3.7 to 3.9 times in standard length. No tubercles on snout of breeding males. Posterior edge of lower lip nearly a straight line, snout definitely overhangs mouth. Tail pinkish or red in life. Dorsal rays (10) 12-13 (15); anal rays 7 (8); pelvic rays 8- 10 (11); pectoral rays (14) 16-17 (19).

Moxostoma macrolepidotum, shorthead redhorse



- F'. Lateral scales without definite dark spots at their bases. Posterior margin of lips forming an obtuse angle, folds of lips not broken by transverse grooves except possibly near corners of mouth. Lateral line scales (39) 40-43 (45). Pelvic fin rays (8) 9-10, usually 9. Body deeper, less than 4.0 in standard length. Posterior edge of lower lip forms a definite angle of about 100 degrees, snout very slightly overhangs mouth. Tail gray to orange in life. Dorsal rays (11) 13-14 (15); anal rays 7; pectoral rays (15) 16-18 (19). Potomac River drainage.

Moxostoma erythrurum, golden redhorse



KEY TO THE MINNOWS

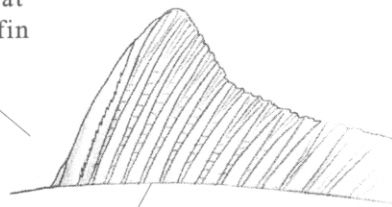
- A. Dorsal fin long, with 14 or more branched rays. Dorsal fin with a hard, serrated first ray (double serrations on posterior edge).

Go to B.

- A'. Dorsal fin short, consisting of fewer than 12 rays, lacking a hard, serrated first ray (the short, rudimentary rays at the fronts of the dorsal and anal fins are not counted).

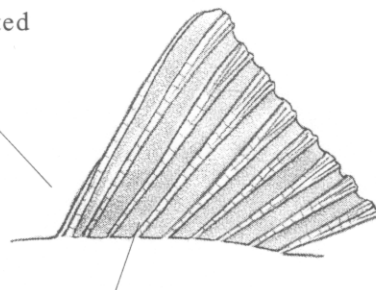
Go to C.

Serrated spine at front of dorsal fin



More than 14 dorsal fin rays

No hard, serrated ray at front of dorsal fin

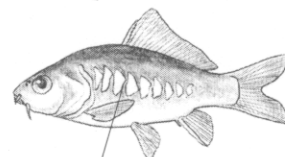
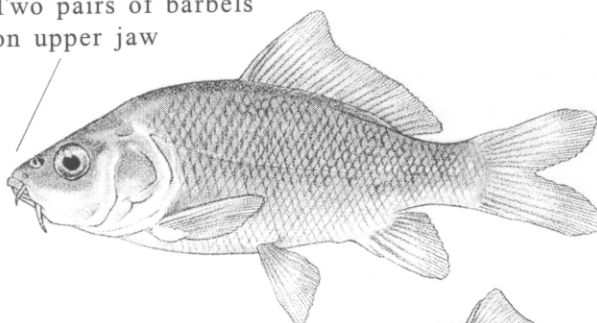


Less than 12 dorsal fin rays

- B. Upper jaw with two pairs of long barbels. Lateral line scales (32) 35-41 [a variety known as "mirror carp" have only a few large scales or no scales]. Dark spot on scale bases. Dorsal fin rays I, (15) 18-20 (23); anal fin rays I, (4) 5 (6); pelvic rays 8-9; pectoral rays (14) 15-16 (17); gill rakers on first arch 21-29. Introduced, abundant statewide.

Cyprinus carpio, common carp

Two pairs of barbels on upper jaw

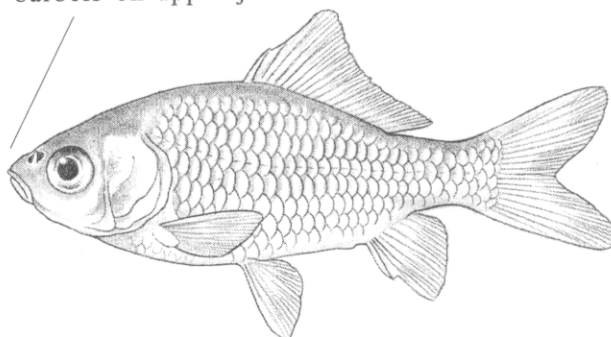


"Mirror carp" - note few large scales

- B'. Upper jaw without barbels. Lateral line scales 25-34 (35). (*C. carpio* and *C. auratus* known to hybridize, often producing intermediates with one or more small, often asymmetrical barbels and 30-35 scales in lateral line). No dark spot at scale bases. Dorsal fin rays II-III (IV), (14) 15-18 (19); anal fin rays II-III, 5-6 (7); pelvic rays 8-10; pectoral rays 14-17. Introduced.

Carassius auratus, goldfish

No barbels on upper jaw

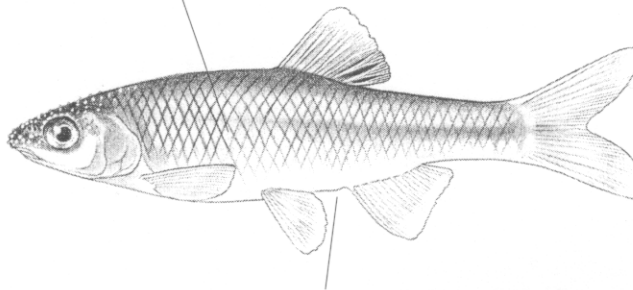


- C. Belly rounded, without a keel-like area in front of the anus. Lateral line straight or only moderately decurved.

Go to D.

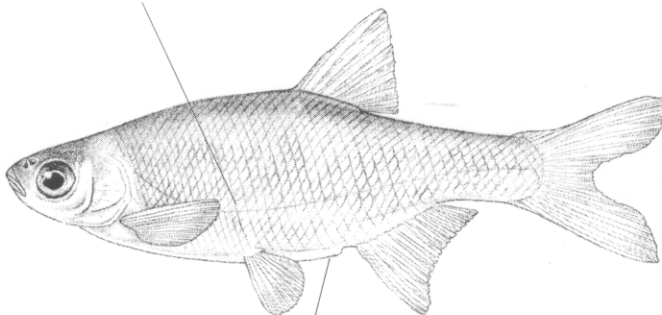
- C'. Belly with a moderately sharp, short fleshy keel (not covered with scales) just in front of the anus, body compressed. Lateral line deeply decurved. Peritoneum dusky. Dorsal fin rays (7) 8 (9); anal fin rays (8) 12-15 (19); lateral line scales (39) 44-56 (57); pelvic rays (8) 9; pectoral rays 16-17 (18). *Notemigonus crysoleucas*, golden shiner

Lateral line not strongly decurved



No fleshy keel on midline of belly

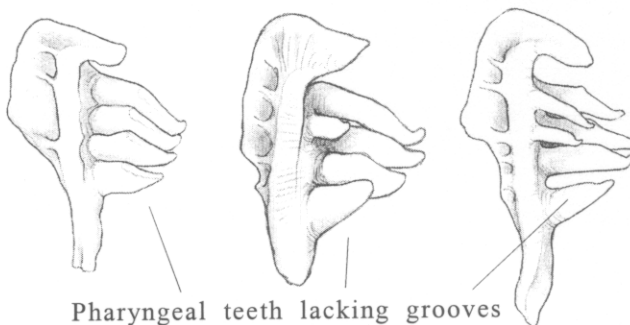
Lateral line strongly decurved



Fleshy keel on belly in front of anus

- D. Pharyngeal teeth without parallel grooves. Anal fin farther forward, the distance from the anal origin to the base of the ventral caudal rays 2.5 times or fewer in the distance from the anal origin to the tip of the snout. Eyes not noticeably low on the side of the head.

Go to E.

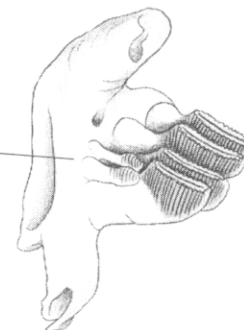


Pharyngeal teeth lacking grooves

- D'. All pharyngeal teeth in the main row with prominent parallel ridges and grooves, 2,5-5,2 or 2,4-5,2. Anal fin far back, the distance from the anal origin to the base of the ventral caudal rays $\frac{1}{3}$ or less of the distance from the anal origin to the tip of the snout. Eyes low on the side of the head, center below midline in larger juveniles and adults. Lateral line scales 35-42; dorsal rays 8-9; anal rays 8-10; pelvic rays 8-9; pectoral rays 19-22.

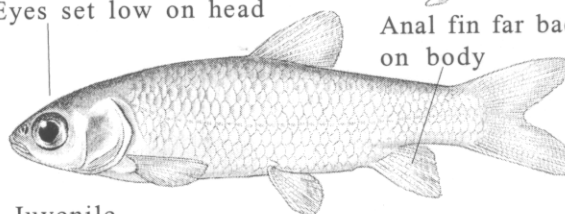
Ctenopharyngodon idella, grass carp

Pharyngeal teeth with transverse ridges, tooth formula often 2,5-5,2 (2,4 is illustrated here)



Eyes set low on head

Anal fin far back on body



Juvenile

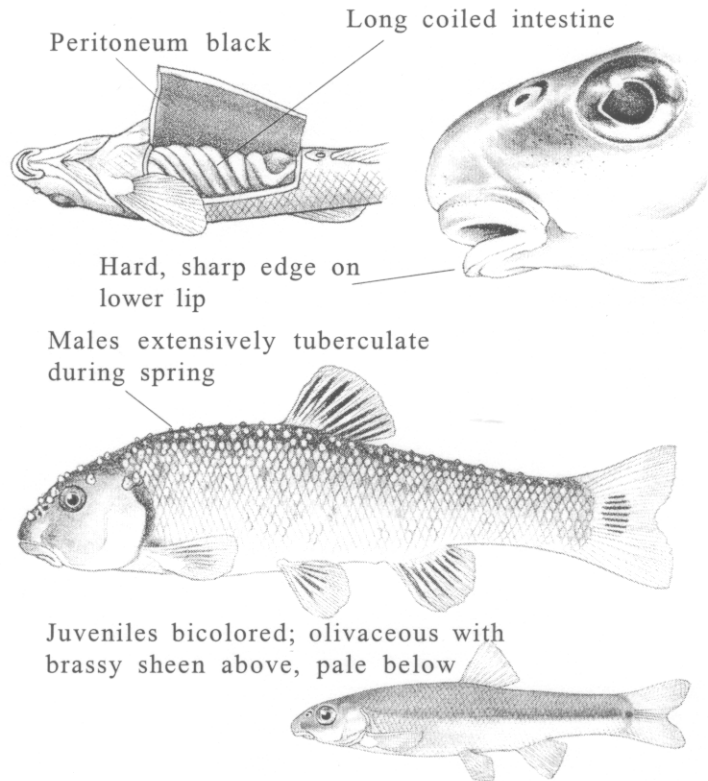
- E. Lower jaw without a raised, cartilaginous rim, although it may be otherwise modified.

Go to F.

- E'. Edge of lower jaw with a sharp, raised cartilaginous rim. Peritoneum black, intestine extremely coiled and wound around swim bladder. Anal fin rays (6 rarely) 7; lateral line scales (43) 44-47 (58); circumferential scales 35-42; dorsal rays 8; pelvic rays 8; pectoral rays 15-16; gill rakers 21-27). Adult males with extensive tuberculation on head and body during spring.

***Campostoma anomalum*,
Central stoneroller**

*Note: *Campostoma pullum* occurs in the Susquehanna river drainage of Pennsylvania, and may occur in the Maryland portion of the drainage. (This species may be identified by lateral line scales 47-55; circumferential scales 38-47; pectoral rays 16-18; gill rakers 24-33).

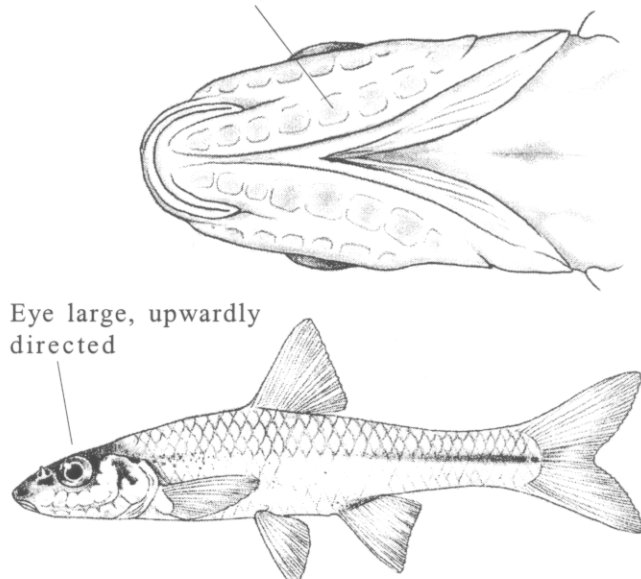


- F'. Head canals not greatly enlarged, not having honeycomb appearance.

Go to G.

- F'. Sensory canals of head greatly enlarged with narrow bony struts between large chambers that are visible through the skin and which give the head, especially the lower jaw, a honeycomb appearance. Underside of head noticeably flattened. Eye large. Lateral line scales (30) 32-33 (34); dorsal rays 8; anal rays 7 (8); pelvic rays 8; pectoral rays 14-16. ***Notropis buccatus*, silverjaw minnow**

Bottom of head flattened, with large chambers

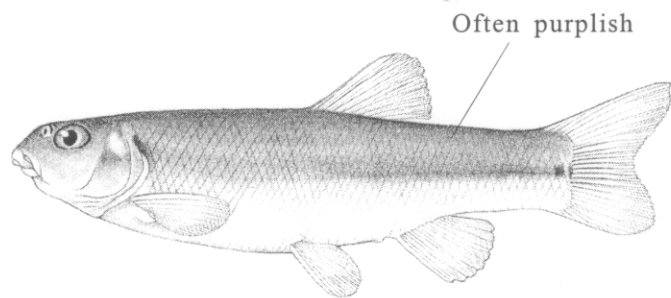
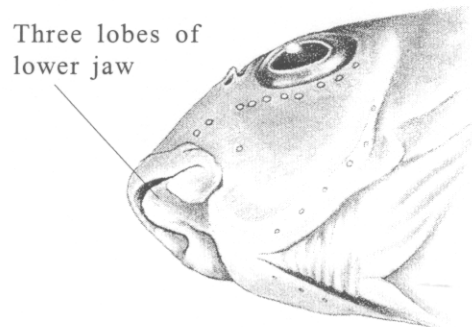


G. Lower jaw not lobate.

Go to H.

G'. Lower jaw with three lobes, the middle lobe bony and protruding like a tongue, the lateral lobes fleshy. Scales crowded anteriorly. Lateral line scales (48) 49-56 (57); dorsal rays 8; anal rays 7; pelvic rays 8 (9); pectoral rays 15-17; gill rakers on lower limb of first arch 4-8. Often with purplish sheen in life.

Exoglossum maxillingua, cutlips minnow

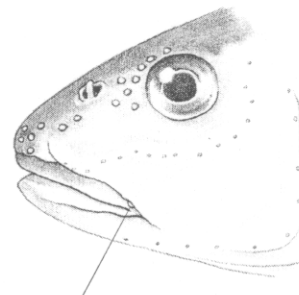
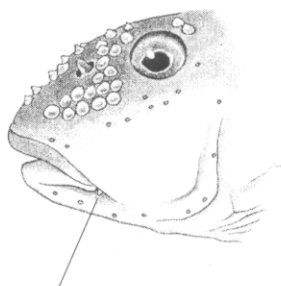
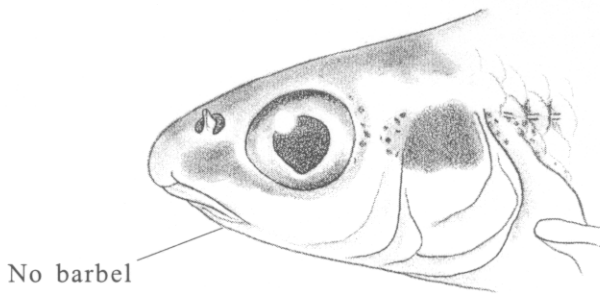


H. Barbels absent.

Go to I.

H'. Maxillary barbels present, located either in a depression behind the end of the maxillary or in the groove above the posterior part of the maxillary bone [may be difficult to see in smaller specimens].

Go to X.



- I.** Mouth not large and oblique, upper jaw not extending to below front of the eye. Scales large, fewer than 55 in lateral series.

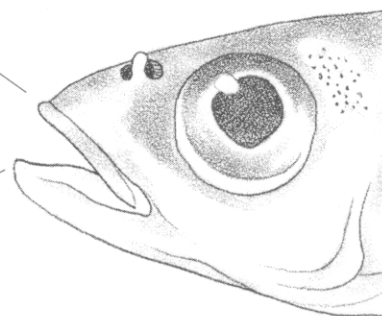
Go to **J.**

- I'.** Mouth large and oblique, upper jaw extending to below front of the eye; front tip of lower jaw well above level of lower edge of eye; lateral line scales 44-70.

Go to **W.**

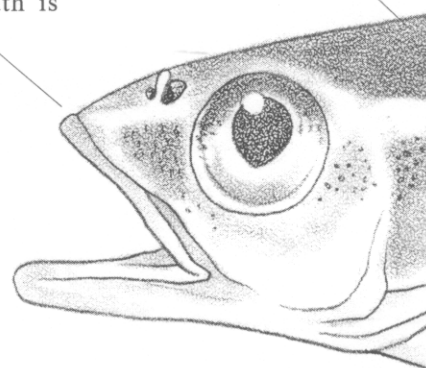
Upper jaw does not reach front of eye

Mouth not as large as below



Scales small, 44-70 in LL

Mouth huge, especially noticeable if mouth is opened fully



- J.** Dorsal fin with a stout ray at the front that is about 1/2 the length of the first principal rays and separated from the latter by membrane. Adults with a distinct black spot at the front of the dorsal fin and well above its base. Predorsal scales small, irregular, and crowded.

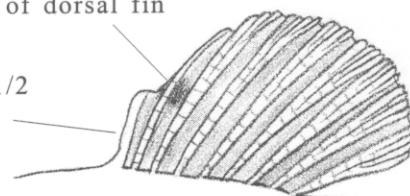
Go to **K.**

- J'.** Short ray at the front of the dorsal fin usually splint-like and closely attached to the first principal ray although there is a narrow separation in some species.

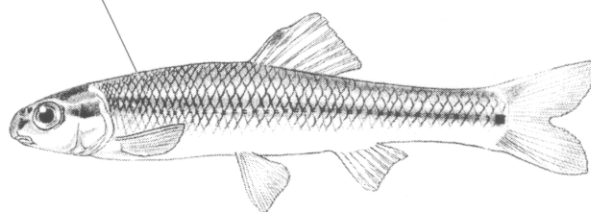
Go to **L.**

Spot at front of dorsal fin

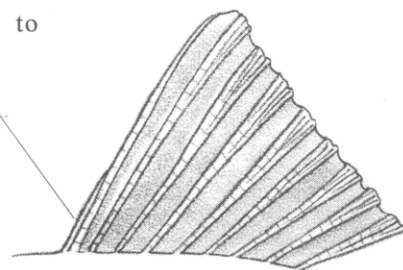
Stout ray, about 1/2 length of next ray



Predorsal scales crowded

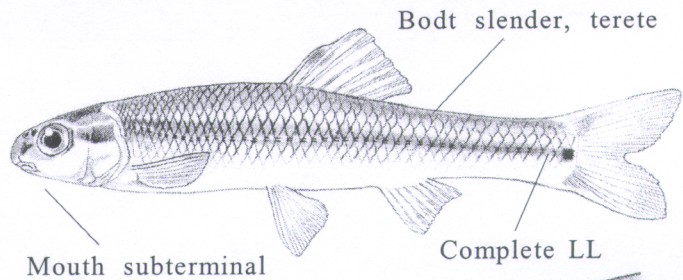


Short ray attached to first principal ray



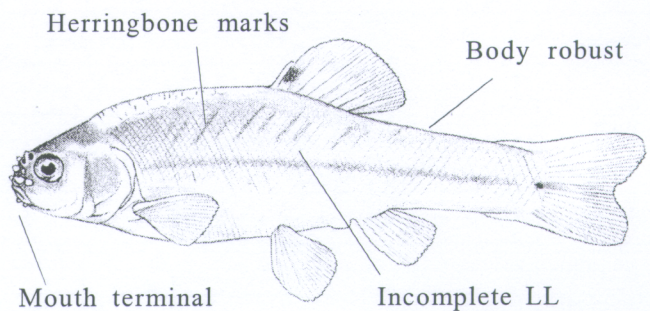
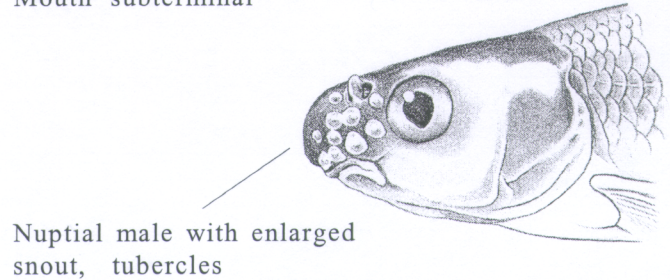
- K.** Mouth inferior, horizontal, not extending to tip of snout. Lateral line complete. Scales in front of dorsal fin crowded and irregular, clearly outlined with dark pigment. Body slender, elongate, and nearly terete. Usually with conspicuous caudal spot. Lateral line scales (37) 38-42 (43); dorsal rays 8; anal rays 7 (8); pelvic rays 8; pectoral rays (14) 15-16 (17).

Pimephales notatus, bluntnose minnow



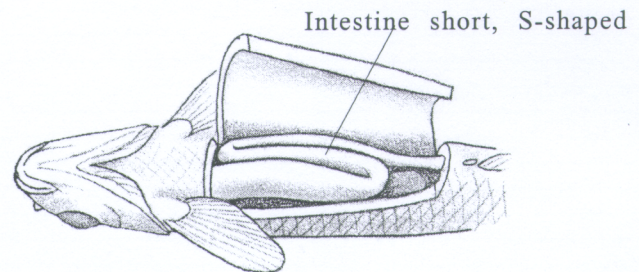
- K'.** Mouth terminal, extending to tip of snout. Lateral line incomplete. Scales in front of dorsal crowded but not definitely outlined with dark pigment, body short and deep, rather robust. Midlateral scales 41-54; dorsal rays 8; anal rays 7; pelvic rays 8; pectoral rays (14) 15-16 (18). Often with herringbone shaped markings on sides.

Pimephales promelas, fathead minnow



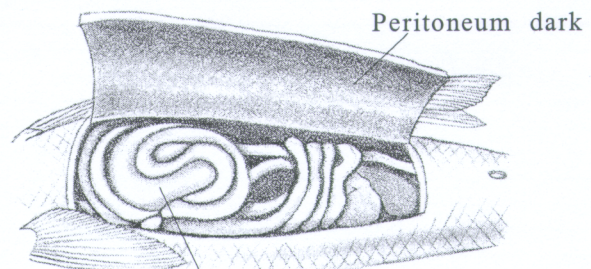
- L.** Lower jaw U-shaped, intestine short and S-shaped, without extra loops on the right side.

Go to **M.**

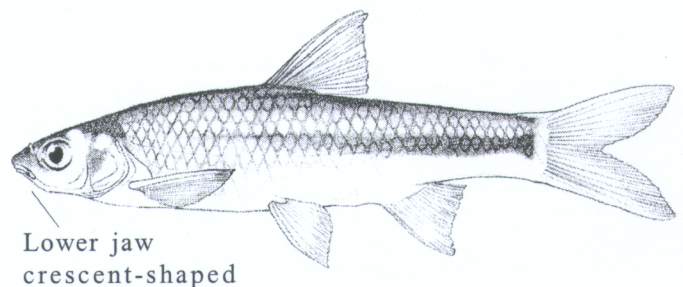


- L'.** Lower jaw crescent-shaped, intestine with extra loops on the right side (may be visible in preserved specimens). Peritoneum dark. Lateral line unpigmented, lacks caudal spot, edges of scales not heavily pigmented, edge of anal fin straight. Dorsal fin rays (7) 8; anal fin rays (7) 8 (9); lateral line scales (32) 34-37 (40); pelvic rays (7) 8; pectoral rays (14) 15 (16). Color in live adults often metallic [bright] gold.

Hybognathus regius,
Eastern silvery minnow

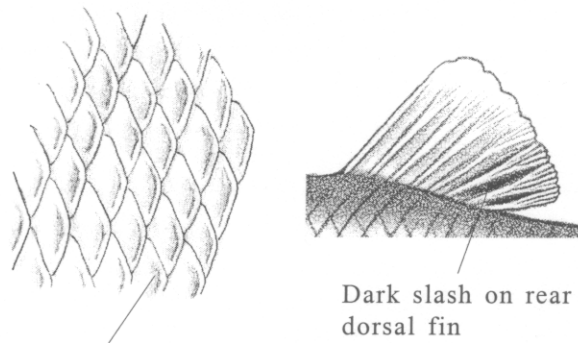


Intestine long and coiled, with extra loops



- M.** Scales of the back and upper sides with narrow dark margins; appearing distinctly diamond-shaped. Posterior interradial membranes of the dorsal fin with dark pigment.

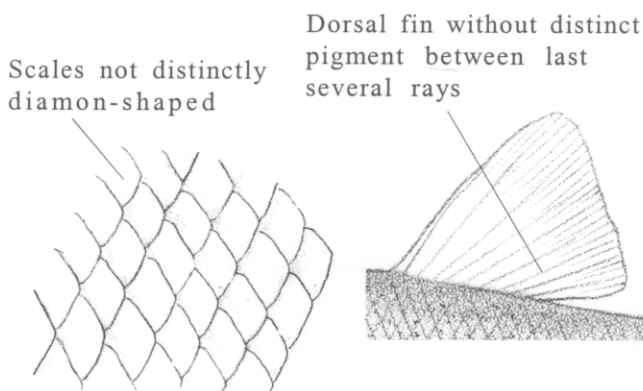
Go to **N.**



Dark margins on scales make them appear diamond-shaped

- M'.** Scales regular. Dorsal fin without definite pigment on posterior interradial membranes.

Go to **O.**



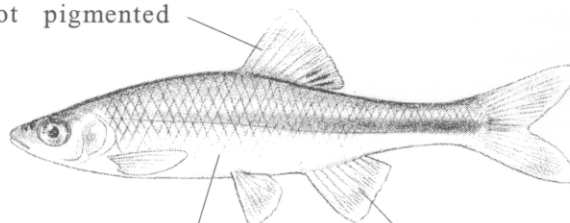
Scales not distinctly diamond-shaped

Dorsal fin without distinct pigment between last several rays

- N.** Anal rays (7) 8 (9). Lateral line scales (36) 37-39 (42); dorsal rays 8; pectoral rays (12) 13-15 (16); body depth 22-25% of standard length. Membranes between the first 3 principle dorsal fin rays lacking pigment except in breeding males with nuptial tubercles. Lateral band on posterior part of body narrow and largely below midline. Fin bases typically white.

Cyprinella spiloptera, spotfin shiner

Anterior dorsal membranes not pigmented



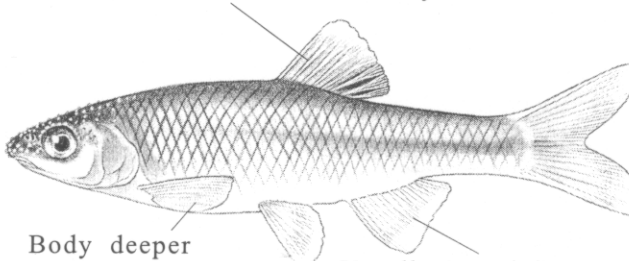
Usually 8 anal fin rays

Body relatively slender

- N'.** Anal rays (7) 9 (10); lateral line scales (32) 35-37 (38); dorsal fin rays 8; pectoral rays (11) 13-14 (16); body depth 24-27% of standard length. All dorsal interradial membranes dusted with melanophores in addition to the darkly pigmented areas between posterior rays. Lateral band on posterior part of body wider and nearly median.

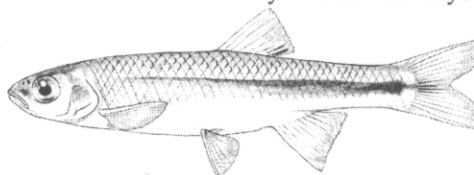
Cyprinella analostana, satinfin shiner

Anterior dorsalmembranes dusky



Body deeper

Usually 9 anal fin rays

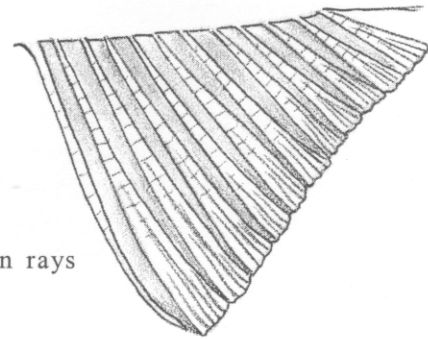


O. Anal rays 10 to 13.

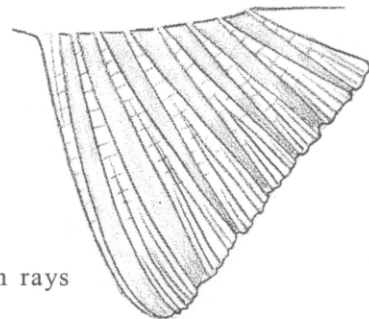
Go to P.

O'. Anal rays 7 to 9.

Go to R.



10 to 13 anal fin rays

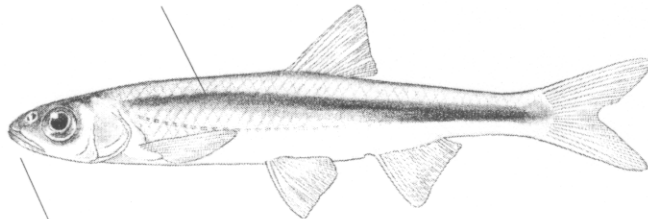


7 to 9 anal fin rays

P. Pre-dorsal stripe anterior portion of lateral stripe relatively well developed and often distinct. Snout more pointed, about equal to postorbital head length.

Go to Q.

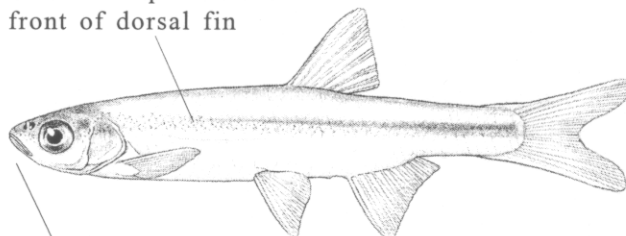
Lateral stripe distinct in front of dorsal fin



Snout moderately pointed

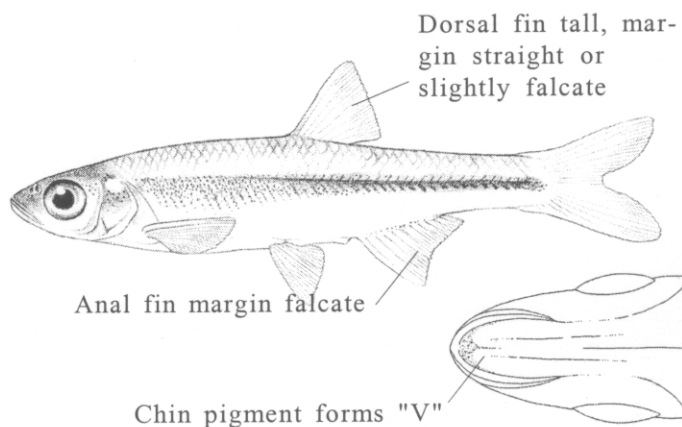
P'. Pre-dorsal stripe absent or weakly developed and diffuse. Anterior portion of lateral stripe with no pigment on lateral line pores. Snout blunt, contained 1.5 times in postorbital head length. Lateral line scales 35-43; dorsal rays 8; anal rays (9) 10-11; pectoral rays (13) 14-16 (17). Introduced as a baitfish in Western MD reservoirs.
Notropis atherinoides, emerald shiner

Lateral stripe fades in front of dorsal fin

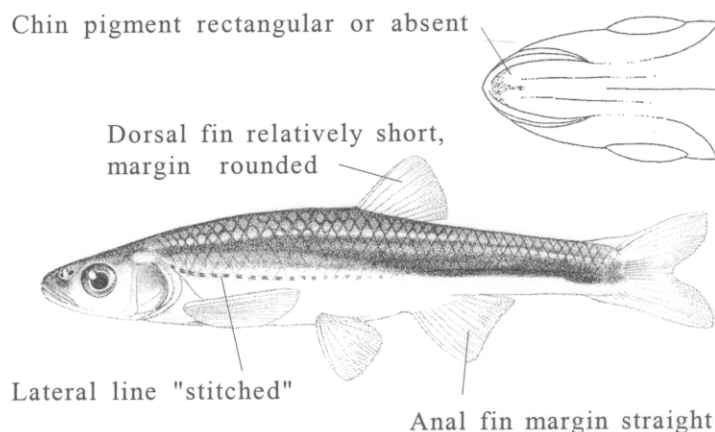


Snout blunt

- Q.** Anterior tip of dorsal fin, when depressed, extending past the posterior tip of fin. Chin pigment with a well-defined v-shaped extension onto the midline of the gular region. Pectoral rays 14-16, anal rays (9) 10-12. Margin of extended anal fin slightly falcate. Lateral line decurved, ending in a faint spot. Dorsal fin insertion behind pelvic fin insertion. Head relatively large, 1/4 of standard length; snout short, mouth oblique. Lateral line scales (35) 37-40 (47); dorsal rays (7) 8 (9); pelvic rays (7) 8 (9).
***Notropis amoenus*, comely shiner**



- Q'.** Anterior tip of dorsal fin, when depressed, no longer than the posterior tip of fin. Chin pigment rectangular, occasionally vague, without a distinctive triangular or V-shaped backward mark on the gular midline. Pectoral rays 13-14; anal rays (9) 10 (12). Margin of extended anal fin straight. Snout long, distance from anterior edge of eye to tip of snout greater than eye diameter. Anterior half of body often reddish, snout of males bright red in spring. Lateral line pores dark edged. Lateral line scales (38) 39-41; dorsal rays 8; pelvic rays 8.
***Notropis rubellus*, rosyface shiner**

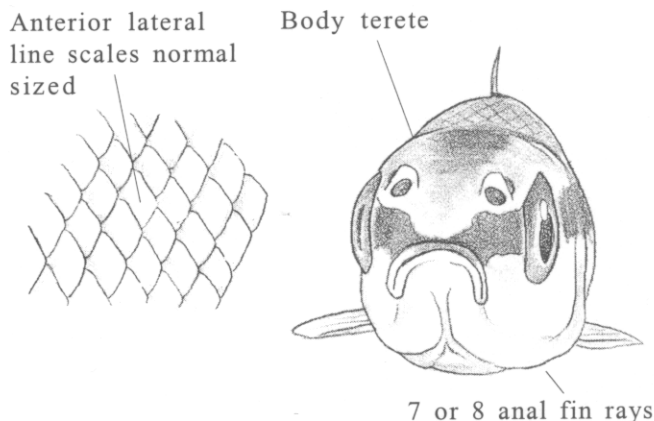
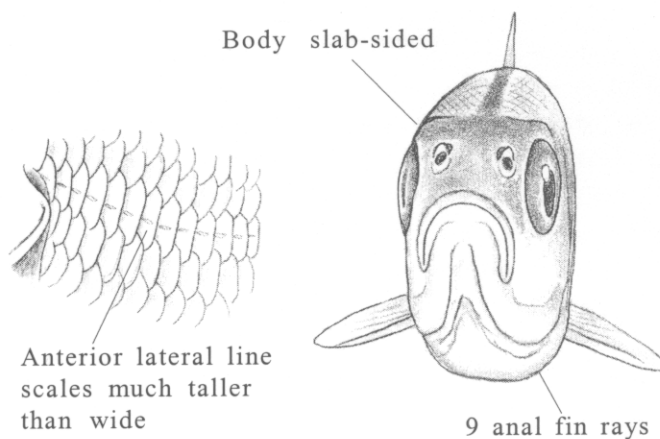


- R.** Body slab sided, its greatest depth more than 1.5 times its greatest width or more; exposed portion of lateral line scales more than twice as high as wide; pharyngeal teeth 2,4-4,2; anal rays usually 9.

Go to **S.**

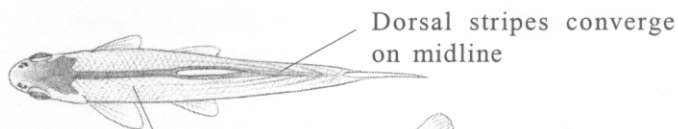
- R'.** Body nearly terete in cross section, its greatest depth ≤ 1.5 times its greatest width. Anal rays usually 7 or 8.

Go to **T.**

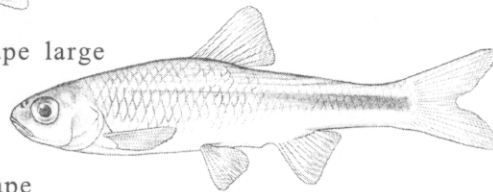


- S. Anterior dorsolateral scales relatively large, (13)14-16 (19) between the dorsal origin and the back of the head, in the third to sixth row above the lateral line. Dorsal surface of the body with pronounced wavy or straight lines meeting behind the dorsal fin in a series of chevron-shaped marks. Tip of chin and gular area dusky. Lateral line scales (36) 37-39 (42); dorsal rays 8; anal rays (8) 9 (10).

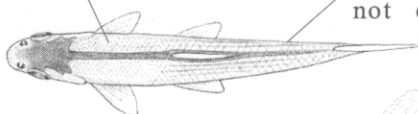
Luxilus chrysocephalus, striped shiner



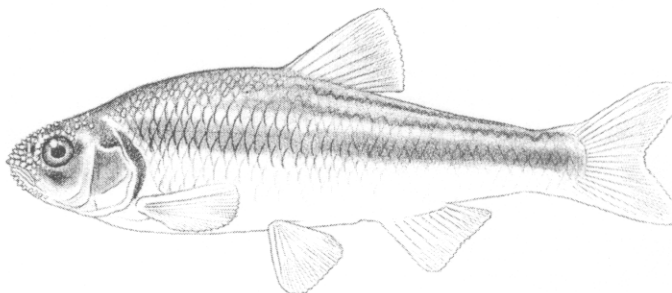
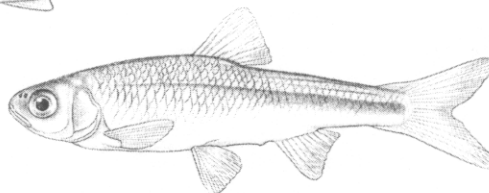
Scales on nape large



Scales on nape small, crowded



Dorsal stripes weak, do not converge



- S'. Anterior dorsolateral scales small, crowded anteriorly, anterior dorsolateral scale count (16) 18- 24 (30). Without prominent stripes on the upper part of the body although breeding males often have wide longitudinal stripes. No pigment on the chin and gular area in Susquehanna drainage fish. Back with thin dusky lines running parallel to each other, not converging to form a V. Dorsal origin anterior to pelvic origin. Lateral line scales (36) 38-40 (43); dorsal rays 8; anal rays (8) 9 (10).

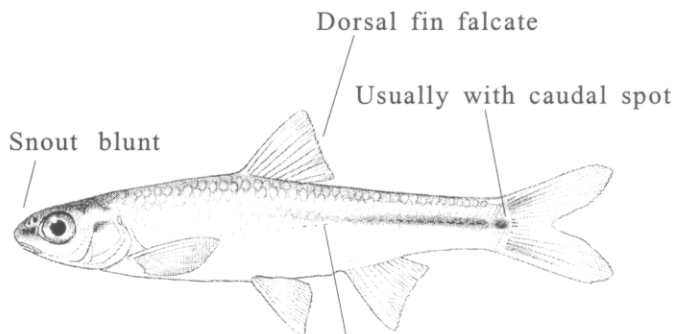
Luxilus cornutus, common shiner

- T. No prominent spot at the base of the tail although there may be a small triangular or irregular spot at the end of the lateral pigment band.

Go to U.

- T'. Caudal fin base often with a prominent, large, round black spot (sometimes masked by silvery pigment and often obsolescent in individuals from smaller streams). Snout blunt and overhanging the mouth. Dorsal fin falcate. Peritoneum silvery. Lateral stripe usually absent in live specimens (more typical in juvenile fish), no pigment on lower lip. Ventral edge of caudal fin generally milky white, scales on lateral line have small, dark crescent-shaped bars. Lateral line scales (34) 35-38 (42); dorsal rays 8 (rarely 9); anal rays (7) 8 (9); pelvic rays (7) 8 (10); pectoral rays 13-16 (17).

Notropis hudsonius, spottail shiner



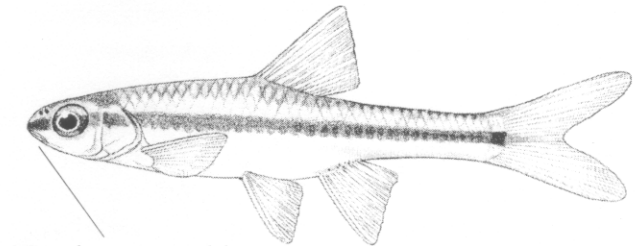
Silvery, without lateral stripe in life

U. Anal rays 7, no black pigment inside mouth.

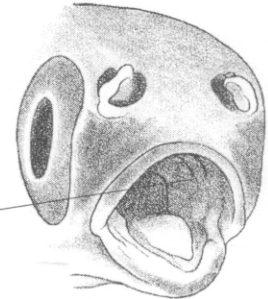
Go to V.

U'. Anal rays 8. Dark pigment present inside the mouth. Lateral stripe extending from snout, through eye, to tail. Lower lip with pigment, lateral line complete or incomplete. Anterior 1/2 of lateral band uniform, without zigzags. Mouth more oblique, making an angle of less than 60 degrees from vertical. Intense black pigment about the anus, anal fin base, and caudal peduncle, detached spot at base of caudal fin. Adult length 50 mm. Midlateral scales 32-34(36); dorsal rays (7) 8; pelvic rays 7-8 (9); pectoral rays 11-13.

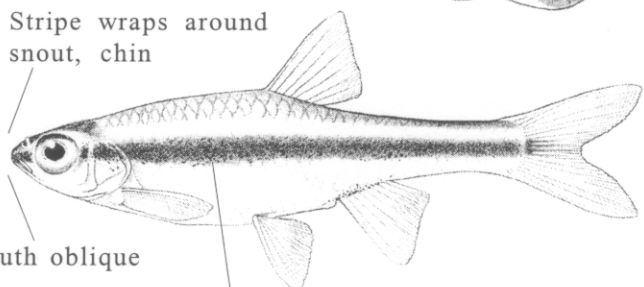
Notropis chalybaeus, ironcolor shiner



Mouth not as oblique



Black pigment inside mouth

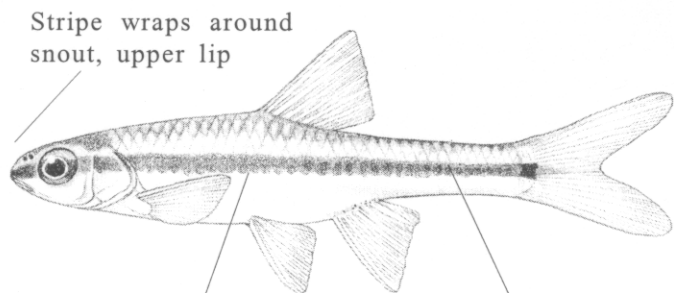


Mouth oblique

Lateral stripe dark, even-edged anteriorly

V. Anal rays 7 (8). Lateral stripe continued forward through eye and around snout but not on chin. Dark pigment on scales in the lateral band sometimes producing a zigzag pattern. Lateral line incomplete in juveniles, may be complete in large adults. Breast nearly all scaled. Mouth less oblique, making an angle of much more than 60 degrees from vertical. Adult length 50 mm. Midlateral scales (31) 33-36 (37); dorsal rays 8; pelvic rays 8; pectoral rays (11) 12-13 (14). Coastal Plain, highly rare.

Notropis bifrenatus, bridle shiner



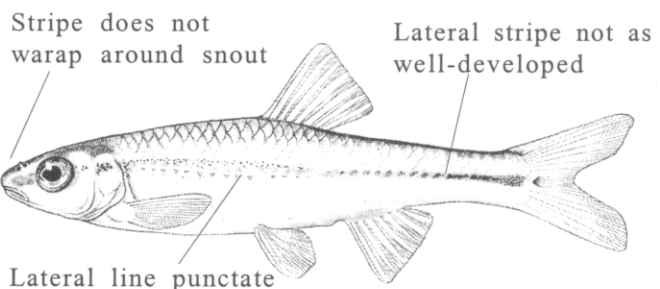
Stripe wraps around snout, upper lip

Lateral stripe irregular on anterior ventral edge

Lateral stripe well developed, dark

V'. Lateral stripe weakly developed (dotted or appearing as double dashes) not continued forward of the eye, although there may be a dark spot on the preorbital region. Breast almost without scales, lateral line complete. Lateral line scales (33) 34-37; dorsal rays 8; anal rays 7 (8); pectoral rays (12) 13-15.

Notropis procne, swallowtail shiner



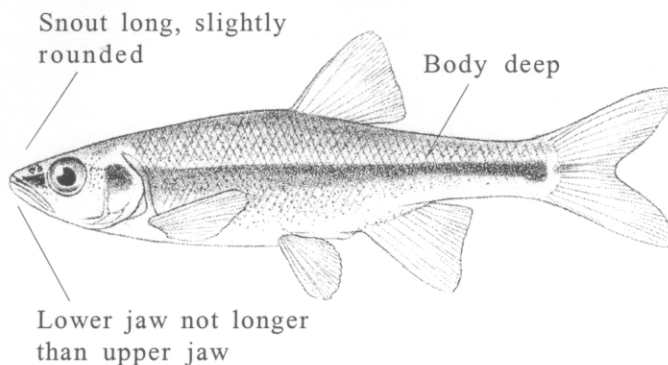
Stripe does not wrap around snout

Lateral stripe not as well-developed

Lateral line punctate

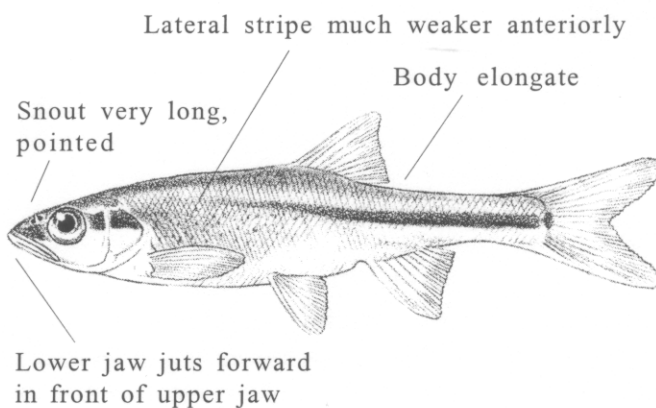
- W. Lateral line scales (44) 47-54 (58); eye diameter about equal to snout length; body depth about 4 times into standard length; lateral profile of front of head rounded; tip of lower jaw even with or slightly in front of upper jaw. Dorsal rays (7) 8 (9); anal rays (8) 9 (10); pelvic rays (6) 8 (10); pectoral rays (13) 15-16 (17).

Clinostomus funduloides, rosyside dace



- W'. Lateral line scales 59-70; eye diameter less than snout length; body depth about 4.5 times into standard length; lateral profile of front of head pointed; tip of lower jaw extends well in front of upper jaw. Lateral stripe not continuous along side. Youghiogheny drainage (Bear Creek) only.

Clinostomus elongatus, redbside dace

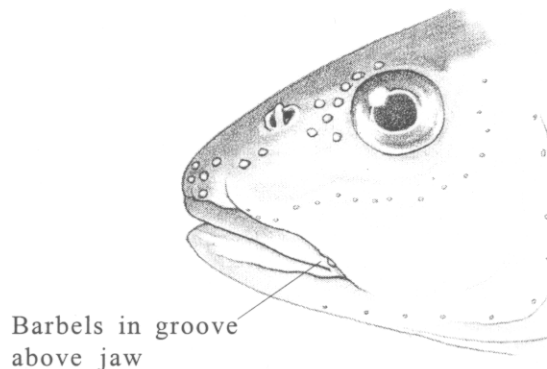
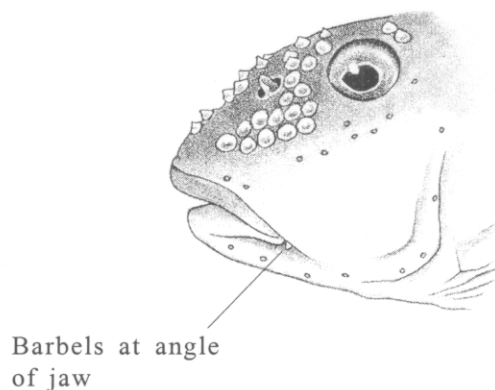


- X. Barbels terminal, located in depression behind the end of the maxillary.

Go to Y.

- X'. Barbels preterminal, located in the groove above the maxillary. Difficult to see in small fish unless mouth is opened.

Go to Z.

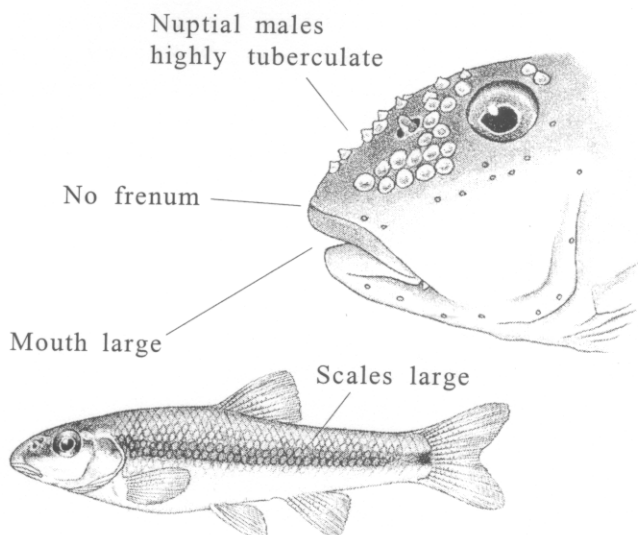


- Y. Lateral line scales 55 or more. Upper jaw nonprotractile, upper lip joined to the tip of the snout by a bridge of tissue (frenum).

Go toBB.

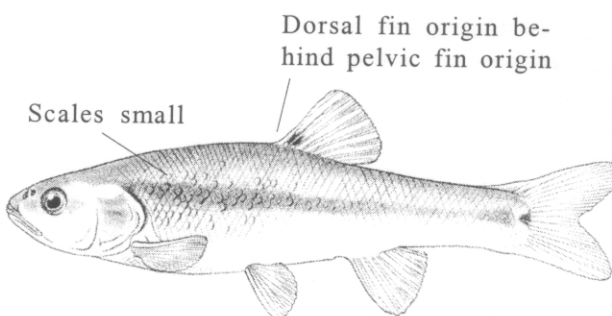
- Y'. Lateral line scales (37) 38-40 (43). Frenum absent. Mouth large and subterminal, snout blunt and only slightly overhanging mouth. Eye diameter less than length of upper jaw. Breeding males with large nuptial tubercles on head. Dorsal rays 8 (9); anal rays 7 (8); pelvic rays 8; pectoral rays (15) 17-18 (19); gill rakers on lower limb of first arch (6) 7-9 (10).

Nocomis micropogon, river chub



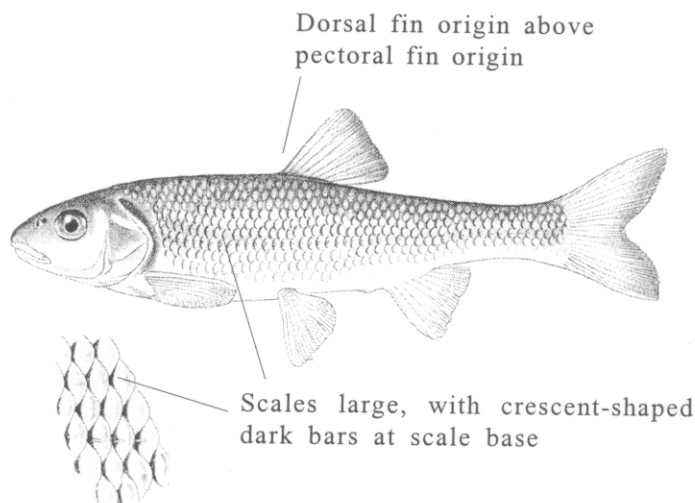
- Z. Scales small, 49 to 78 in lateral line. Dorsal fin beginning just behind base of pelvic fins.

Go toAA.

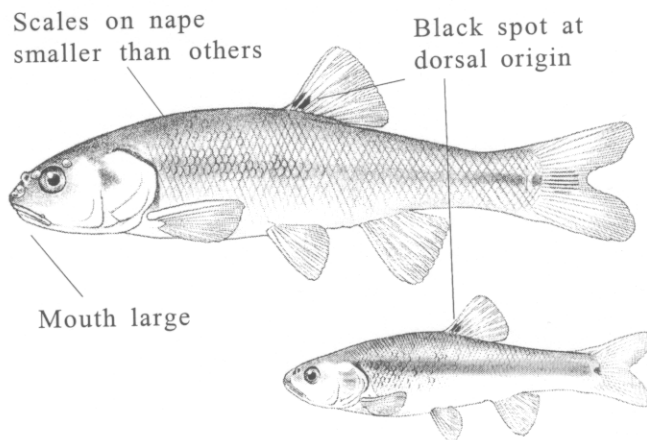


- Z'. Lateral line scales (43) 44-47 (50), and not especially crowded in front of the dorsal fin. Base of 1st ray of dorsal fin directly over pelvic fin base. Crescent-shaped black bars at scale bases. Dorsal rays 8 (9); anal rays (7) 8; pelvic rays (7) 8 (9); pectoral rays (15) 17-18 (19); gill rakers on lower limb of first arch 7-10 (11).

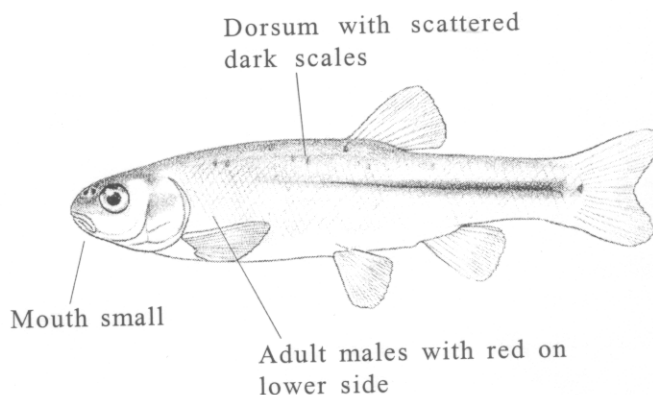
Semotilus corporalis, fallfish



- AA.** Prominent black spot at anterior base of dorsal fin, lateral line scales (49) 52-58 (62). Base of 1st ray of dorsal fin just posterior to pelvic fin base. Anterior dorsal midline scales much smaller than other body scales. Upper jaw extending to at least below front of eye. Pre-dorsal stripe present. Dorsal rays 8; anal rays 8; pelvic rays (7) 8 (9); pectoral rays (14) 15-18 (20); gill rakers on lower limb of first arch 8-11.
***Semotilus atromaculatus*, creek chub**

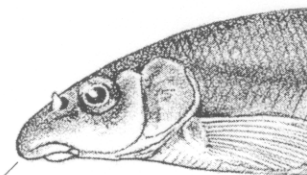


- AA'.** No spot at base of dorsal fin. Posterior end of upper jaw does not reach as far back as anterior edge of eye. Dorsum with irregular pattern of pigmented scales. Dorsal fin origin posterior to pelvic fin origin. Adults usually less than 80 mm. Lateral line scales (46) 50-56 (60); dorsal rays 8 (9); anal rays (7) 8 (9); pelvic rays (7) 8 (9); pectoral rays 13-15 (16); gill rakers on lower limb of first arch 4-8.
***Margariscus margarita*, pearl dace**



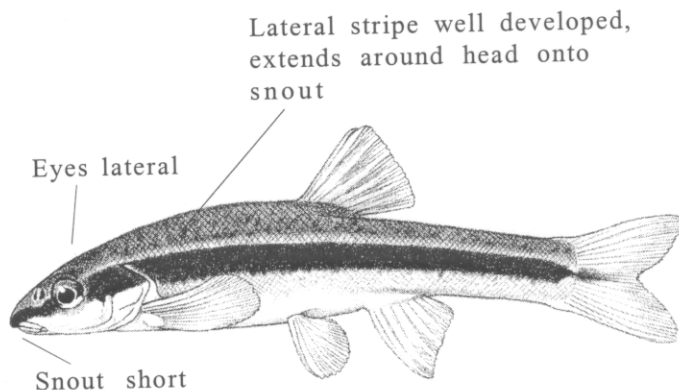
- BB.** Snout long, projecting well beyond the inferior mouth, lateral stripe not continuing around head.

Go to **CC.**



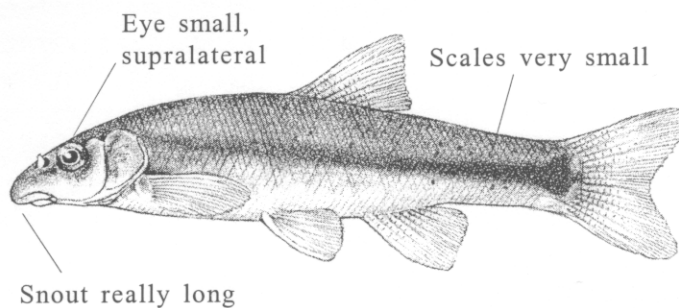
Snout extends well past the mouth

- BB'.** Snout short, at most only slightly overhanging the terminal mouth. Lateral stripe well developed on body and on head. Eyes lateral, the center of the pupil in line with stripe on side of snout. Swim bladder well developed, extending beyond the pelvic fin base. Lateral line scales (46) 51-58 (63); dorsal rays (7) 8; anal rays (6) 7 (8); pectoral rays (12) 13-15 (16).
***Rhinichthys atratulus*, blacknose dace**

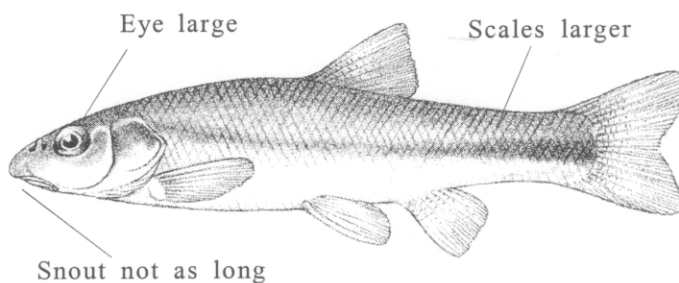


- CC. Lateral line scales (48) 61-75 (76); pharyngeal teeth 2,4-4,2; dorsal rays 8; anal rays 7 (9); pelvic rays (7) 8; pectoral rays (12) 13-15 (17). Lateral dark stripe usually indistinct, fusing with basic coloration of side, often well developed on side of snout. Eyes supralateral, center of pupil above level of the dark line on side of snout. Swim bladder rudimentary, extending only as far back as the base of the pelvic fin. Maximum length 160 mm.

***Rhinichthys cataractae*, longnose dace**



- CC'. 44 to 55 lateral line scales, pharyngeal teeth 1,4-4,1, dark green above, lighter green below. Larger eye and longer head than *R. cataractae*. Youghiogheny drainage only.
- Pararhinichthys bowersi*, Cheat minnow**



KEY TO THE PIKES

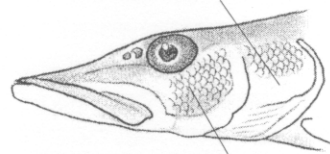
- A.** Lower part of opercles without scales.
Dorsal and caudal fins with dark markings,
10 or more sensory pores on lower jaws.
Suborbital bar absent or indistinct.

Go to **B.**

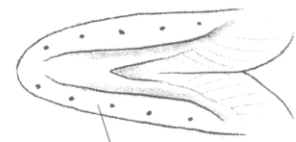
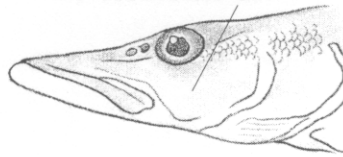
- A'.** Cheeks and opercles both fully scaled,
dorsal and caudal fins without dark
markings, 9 or fewer sensory pores on lower
jaws (both jaws combined). Suborbital bar
usually distinct.

Go to **C.**

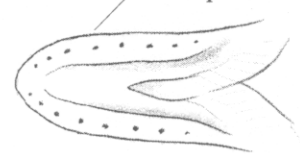
Lower portion of operculum unscaled



No suborbital bar



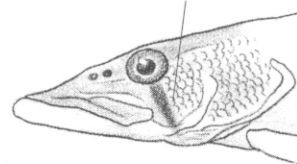
More than 9 pores



Opercles fully scaled



Suborbital bar distinct



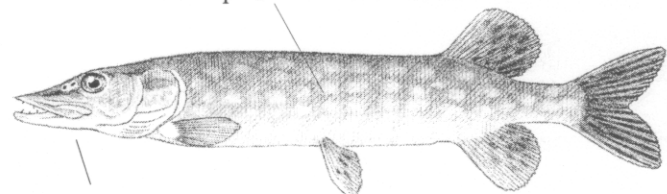
Less than 9 pores



- B.** Cheeks completely scaled, branchiostegal
rays 13 to 16 on each side. Light spots on
darker background on sides and vertical fins.
Sensory pores 10 or 11 on lower jaws.
Lateral line scales 105-148; principal dorsal
rays 15-19; principal anal rays 14-16; pelvic
rays 11-12; pectoral rays 14-17.

Esox lucius, northern pike

Pale spots on dark sides



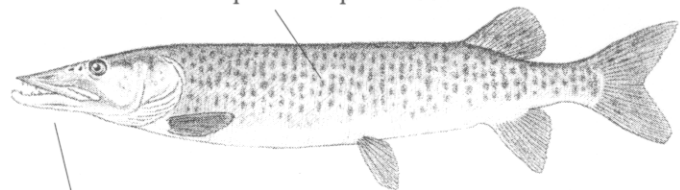
10-11 pores



- B'.** Lower part of cheeks without scales.
Branchiostegal rays 16 to 19. May have
dark spots on body and vertical fins.
Sensory pores 12 to 20 on lower jaws.
Lateral line scales (130) 145-155 (176);
principal dorsal rays 15-19; principal anal
rays 14-16; pelvic rays 11-12; pectoral rays
14-19.

Esox masquinongy, muskellunge

Dark spots on pale sides

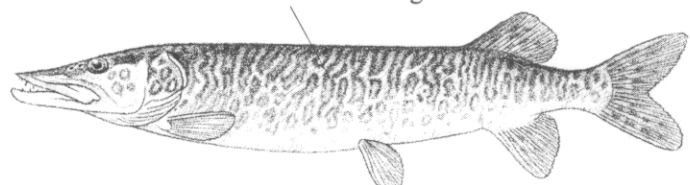


12-20 pores



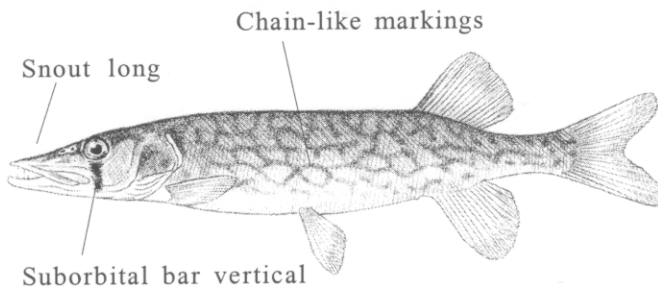
***Note:** Hybrid *E. masquinongy* x *E. lucius* are stocked in several Maryland reservoirs and the mainstem Potomac River. This form is known as the "tiger muskellunge," is meristically intermediate between the two parental forms, but has a distinctive pattern.

Vertical barring



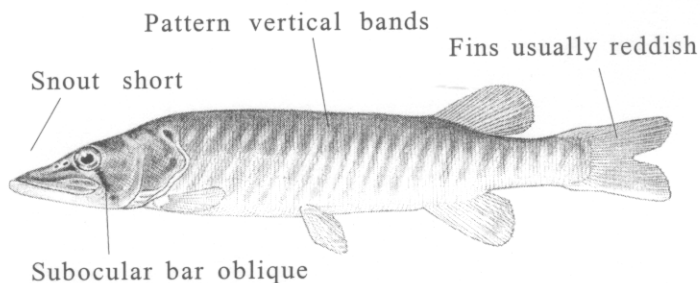
- C. Branchiostegal rays 14 to 17 on each side. Snout long, distance from tip to center of eye more than distance from center of eye to upper end of gill opening. Adults with chain-like pattern against a lighter background on sides of body. Lateral line scales 114-131; principal dorsal rays 14-15; principal anal rays 11-13; pelvic rays 9-10; pectoral rays 12-15.

Esox niger, chain pickerel



- C'. Branchiostegal rays 11 to 13 on each side. Snout shorter, distance from tip to center of eye equal to or less than distance from center of eye to upper end of gill opening. Seldom more than 300 mm long. Subocular bar slanted to posterior from eye. Adults with vertically barred pattern on sides; at least some red in fins of live specimens. Lateral line scales 94-117; principal dorsal rays 15-18; principal anal rays 13-17; pelvic rays (8) 9-10; pectoral rays (13) 14-15 (17).

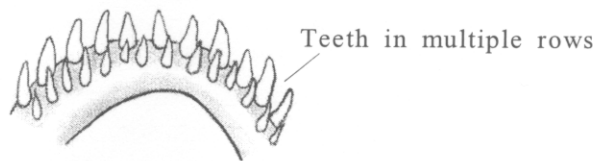
Esox americanus, redfin pickerel



small juvenile

KEY TO THE KILLIFISHES

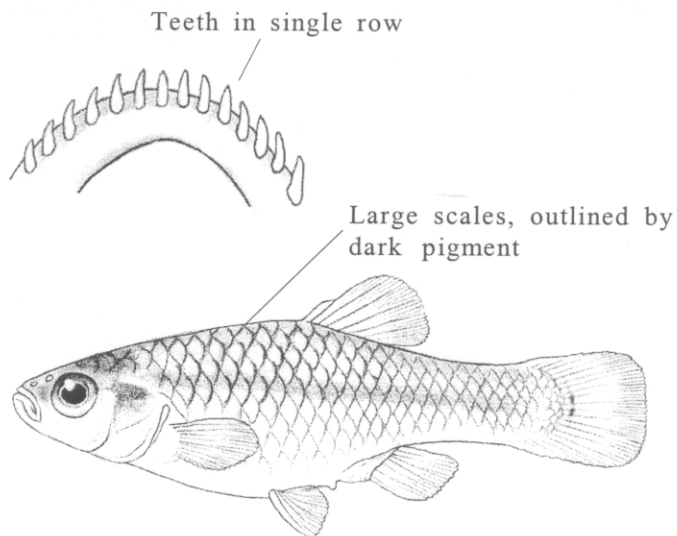
- A. Jaw teeth arranged in more than one series.



Go to B.

- A'. Jaw teeth arranged in a single series, dorsal fin insertion anterior to anal fin insertion. Nondescript, with no obvious markings; scales outlined with darker pigment. Head scarcely depressed. Dorsal fin rays 11-12; anal fin rays 10-22; scales large, lateral line scales 25-26. Chesapeake Bay tributaries, rarely straying above tidewater; historically abundant.

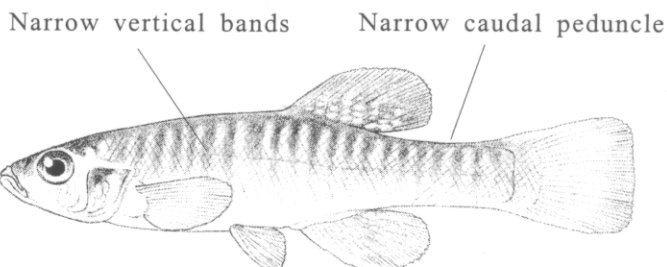
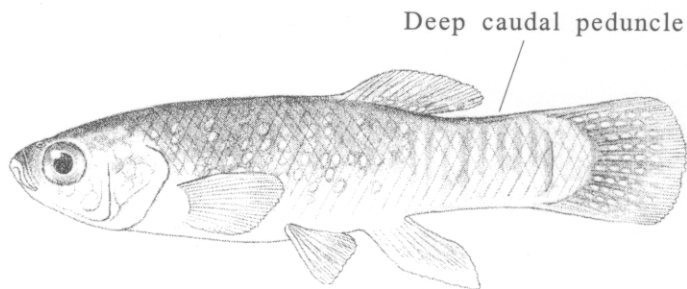
Lucania parva, rainwater killifish



- B. Least depth of caudal peduncle contained less than 9 times in standard length.

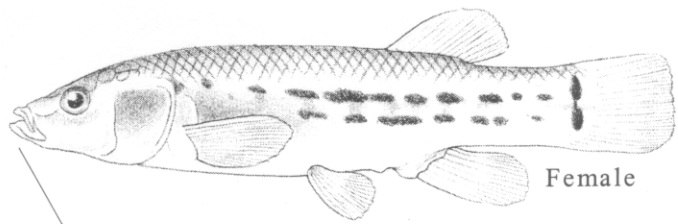
Go to C.

- B'. Least depth of caudal peduncle contained more than 9 times in standard length. Lateral line scales (35) 39-46 (55); dorsal rays (10) 13-14 (15); anal fin rays (9) 10-11 (13); pelvic rays 6; pectoral rays (14) 16-17 (19); ill rakers on first arch (4) 5-6 (7). Pelvic fins inserted about one eye diameter nearer tip of snout than base of caudal fin. Piedmont and Coastal Plain, abundant.
- Fundulus diaphanus*, banded killifish



- C. Long, pointed snout, length 2 times eye length; snout distinctly below horizontal plane of middle of eye. Dorsal fin rays 11-16; anal fin rays 10-12; lateral line scales 33-36. Rarely straying above tidewater in Chesapeake Bay tributaries.

***Fundulus majalis*, striped killifish**



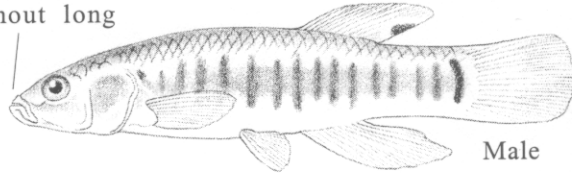
Female

- C'. Short, round snout, length slightly greater than eye length; snout on a level with or slightly above horizontal plane of middle of eye. Pelvic fins usually inserted equidistant from tip of snout and base of caudal.

Female brownish green with 15 dark crossbars; male greenish olive, 15 dark crossbars and many yellowish-white spots. Dorsal fin rays 10-13; anal fin rays 9-11; midlateral scales (31) 30-36 (38); gill rakers on lower limb of first arch (8) 10-12(13). Adult length 110 mm. Piedmont and Coastal Plain.

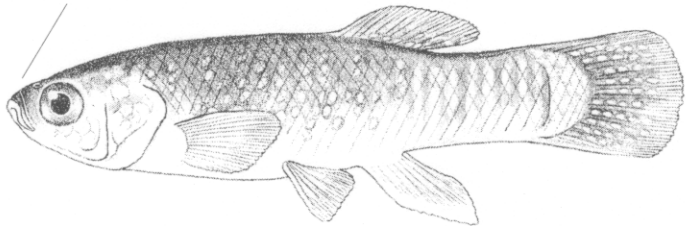
***Fundulus heteroclitus*, mummichog**

Snout long



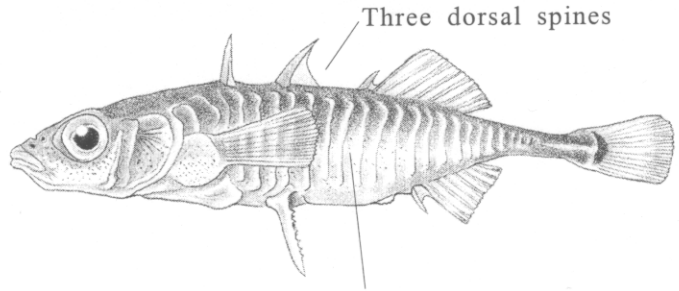
Male

Snout short



KEY TO THE STICKLEBACKS

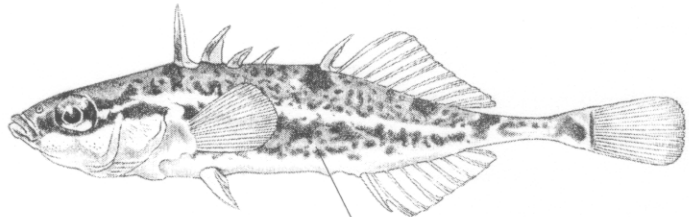
- A. Three dorsal spines, bony plates on sides.
Southern Chesapeake Bay and Sinepuxent Bay, very rare.
Gasterosteus aculeatus,
threespine stickleback



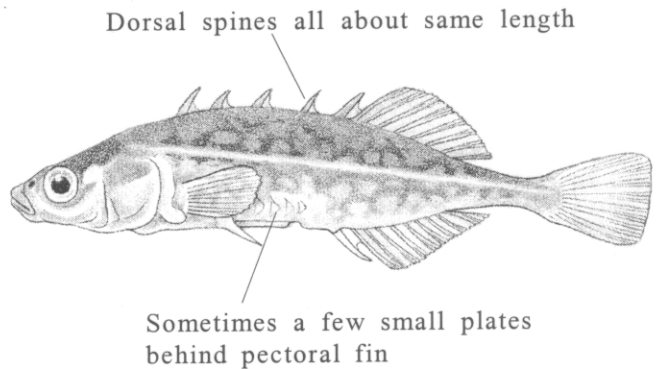
- A'. More than four dorsal spines, no or few bony plates on sides.

Go to B.

- B. Four dorsal spines with length equal to or greater than eye diameter. Chesapeake Bay tributaries, very rare in freshwater.
Apeltes quadracus, **fourspine stickleback**



- B'. Five dorsal spines, all relatively short and of equal length (most less than eye diameter). Not native to Maryland; observed in bait shops in western Maryland but no records from wild.
Culea inconstans, **brook stickleback**



KEY TO THE SCULPINS

A. Pelvic rays usually 4-4.

Go to B.

A'. Pelvic rays usually 3-3. Preoperculo-mandibular (POM) canals united on chin, sharing common median pore. Chin pigment restricted to area around pores. Palatine teeth well developed, usually a series of 4-8 quadrate-shaped blotches along posterior half of body. Lateral line pores usually 20-26. Restricted to spring habitats in the Middle Potomac area.

Cottus sp. n., checkered sculpin

Single median pore

Pigment around pores

Three pelvic rays

Blotches along lower side

B. Chin usually evenly pigmented, if mottling present, is limited to anterior-most margin of chin; POM canals not fused at tip of chin, two median pores present; lateral line pores usually 20-25 (26); membranes of 1st dorsal often with 2 black blotches. Preopercular spines reduced. Anal fin rays 12-14; pelvic fin rays (3) 4; pectoral fin rays 14-15. Saddle width moderate or wide.

Go to C.

B'. Chin almost always strongly mottled; POM canals united on chin, sharing a single median pore (rarely 2); preopercular spines strong; lateral line pores usually 17-25; membranes of first dorsal usually clear. Large patch of palatine teeth present, caudal peduncle length less than postorbital distance. Anal fin rays (10) 12-13 (14); pelvic fin rays (3) 4; pectoral fin rays 15. No pigment bars or blotches on the back anterior to the soft dorsal fin. V-shaped notch in dark vertical bar on caudal fin base.

Cottus girardi

Potomac sculpin

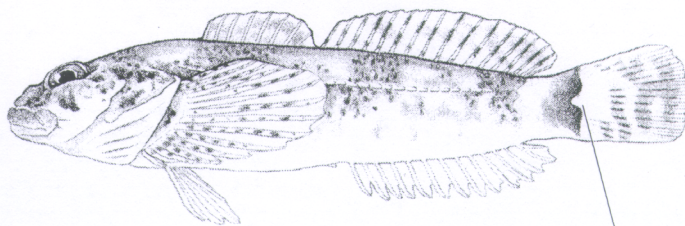
Single median pore

Chin mottled

Dorsal fin clear or slashed

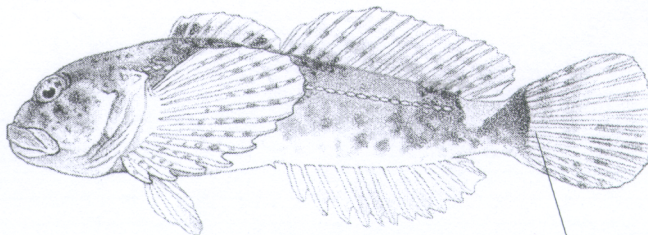
Notch in caudal bar

- C. Caudal base band notched on both sides. Pectoral fin rays 15 modally. Black chins in breeding males. Youghiogheny drainage.
***Cottus bairdii*, mottled sculpin**

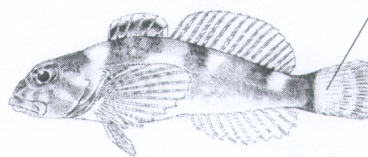


Notch in caudal bar

- C'. Caudal base band unnotched on at least one side. Pectoral fin rays 14 modally. Bluish chins in breeding males. Atlantic Slope (Elk, Susquehanna, Bush, Patapsco, Patuxent, Potomac, and Nanticoke drain ages). Nanticoke population smaller in size, reaches maturity earlier.
***Cottus caeruleomentum*, Blue Ridge sculpin**



Caudal bar not notched



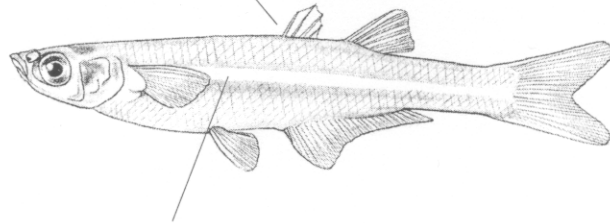
KEY TO THE SILVERSIDES

- A. Spinous dorsal fin origin posterior to vertical line through anus; more than 42 lateral line scales. Usually in high salinity areas.

Go to B.

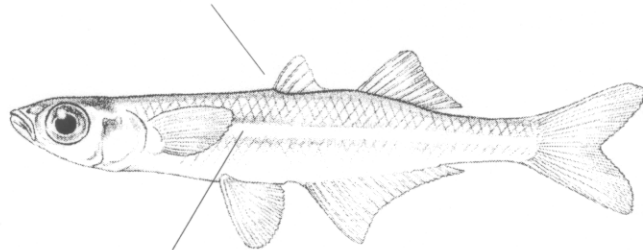
- A'. Spinous dorsal fin origin anterior to a vertical line through the anus. Lateral line scales 37-41. Dorsal IV-VI, 6-11 (usually 9 or 10); anal I, 15-18, circuli on scales extending posteriorly. Pelvic fin abdominal in position. Chesapeake Bay tributaries, usually near or below tidewater.
***Menidia beryllina*, inland silverside**

Spiny dorsal fin origin above or behind anus



More than 42 LL scales

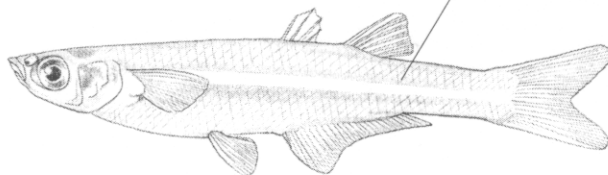
Spiny dorsal fin origin anterior to anus



Less than 42 LL scales

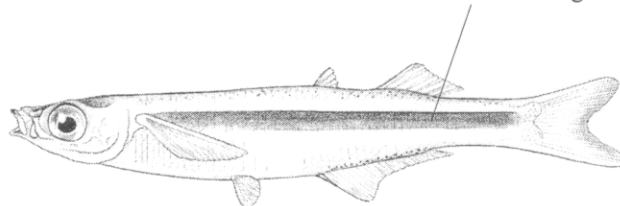
- B. Smooth, cycloid scales; not feeling rough to the touch. Dorsal III-VII, 7-10 (usually IV-VI and 8 or 9); anal I, 20-26; lateral line scale count 44-50.
***Menidia menidia*, Atlantic silverside.**

Scales smooth



- B'. Dorsal IV-VI, 6-8; anal I, 17-22 (usually 18-21); lateral line scale count 42-49. Posterior portion of scales rough to the touch, circuli absent on posterior portion of scales.
***Membras martinica*, rough silverside.**

Scales feel rough



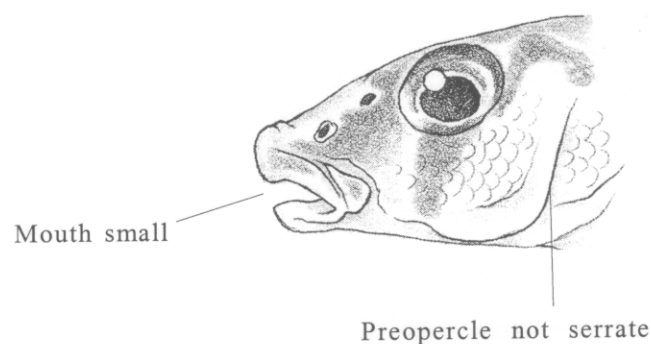
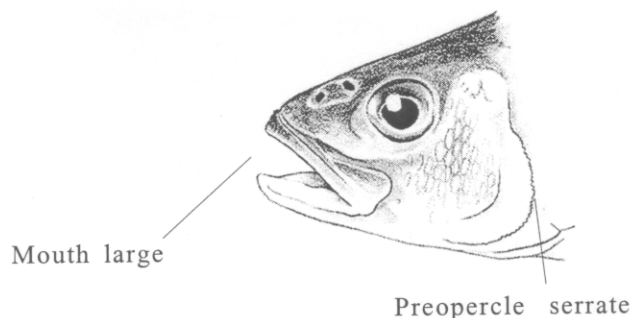
KEY TO THE PERCHES

- A.** Preopercle strongly toothed. Mouth large, reaching nearly to or beyond a point below the middle of the eye. Adults usually longer than 170 mm in length.

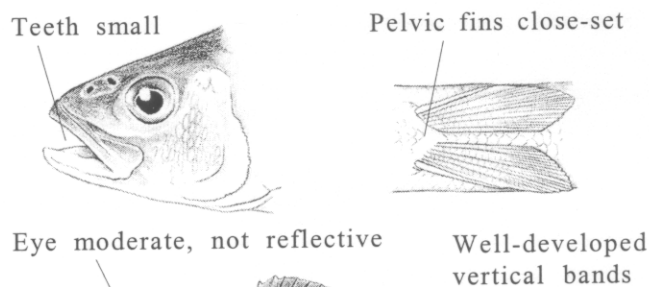
Go to **B.**

- A'.** Margin of preopercle smooth or slightly dentate but never strongly serrated. Mouth small, maxillary not reaching to below middle of the eye. Size small, adults less than 150 mm total length, usually less than 100 mm.

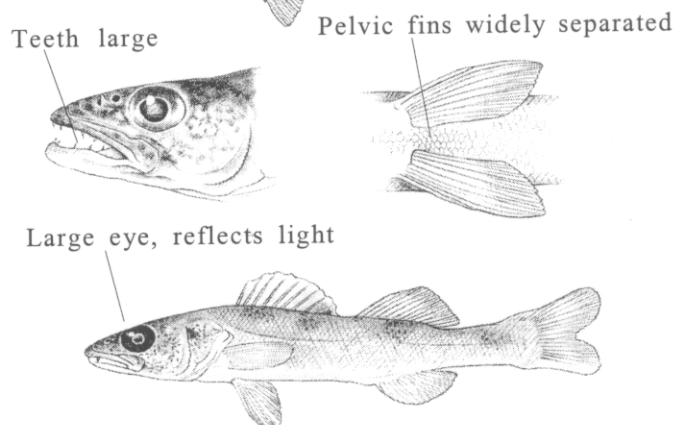
Go to **C.**



- B.** Jaws with small teeth of uniform size and arranged in bands. Body conspicuously marked with even vertical bands. Pelvic fins close together. Pelvic fin rays II, 6-8; lateral line scales (50) 55-64 (70); first dorsal fin (XI) XII-XIV (XV); second dorsal fin I-II (III), (12) 13-15 (16); anal fin II, (6) 7-8 (9); pelvic fin I, 5; pectoral rays 13-15.
Perca flavescens, yellow perch



- B'.** Jaws with some enlarged canine teeth. Body color mostly uniform or with indistinct, irregular and sloping saddle-shaped bands. Eye large, with silvery reflective layer. Space between the pelvic fins wide, exceeding the length of the pelvic fin base. Anal fin II, 12-13. Posterior end of spiny dorsal fin with a conspicuous black blotch. Lower tip of caudal fin white, body with irregular crossbands. Lateral line scales (80) 86-92 (108); first dorsal fin (XII) XIII-XIV (XVI); second dorsal fin I (II), (18) 19-21 (22); anal fin II, (11) 12-13 (14); pelvic fin I, 5; pectoral rays 13-15 (16).
Sander vitreum, walleye

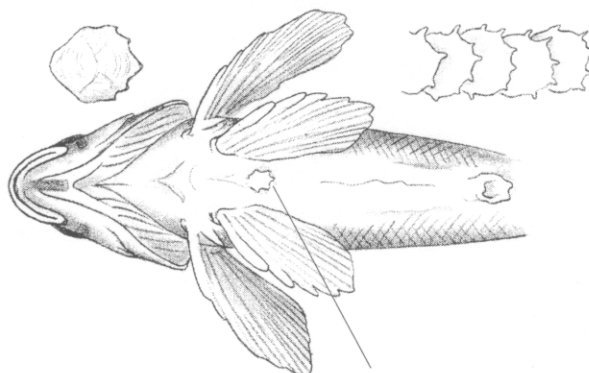


- C. Space between pelvic fin bases with at least one large star-shaped scale. Belly often with a midventral row of enlarged stellate scales. Free edges of opercle with weak teeth or none, mouth small with maxillae not reaching middle of the eye. Lateral line complete from the opercle to caudal fin base. Anal spines 2, head canals uninterrupted.

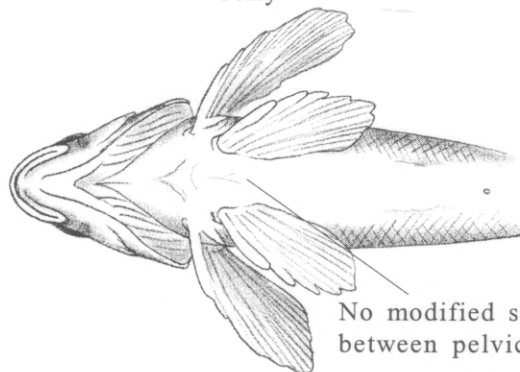
Go to D.

- C'. No enlarged scales between the pelvic fin bases. Belly may be naked or scaled, but never with a midventral row of modified scales.

Go to F.



Modified scale or row of scales between pelvic fin base or on belly

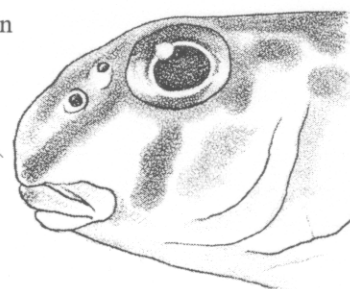


No modified scales between pelvic fins

- D. Snout pointed or blunt but not conical and not protruding in front of mouth. Color pattern variable but not of alternating short and long vertical bars.

Go to E.

Snout not protruding in front of mouth

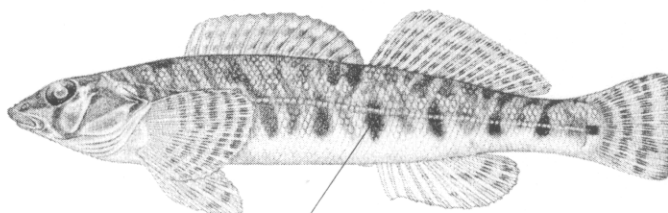
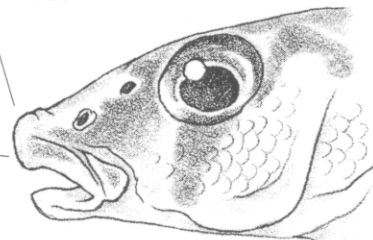


- D'. Snout conical and overhanging the mouth. Body yellowish and conspicuously marked with 14 to 16 alternating long and short, narrow dark vertical bars, some bars may be expanded ventrally into blotches. Breast naked except for modified scales in males, cheek and opercle scaled, belly midline unscaled in females, scaled only posteriorly in males. Lateral line scales (67) 75-91 (100); dorsal fin (XII) XIV-XVI (XVII), (13) 15-17 (18); pectoral fin rays 12-16; anal fin II (rarely I), (8) 10-11 (13); pectoral rays 14-15 (16); gill rakers on lower limb of first arch 15-18. Scales around caudal peduncle 24 to 37.

Percina caprodes, logperch

Snout conical

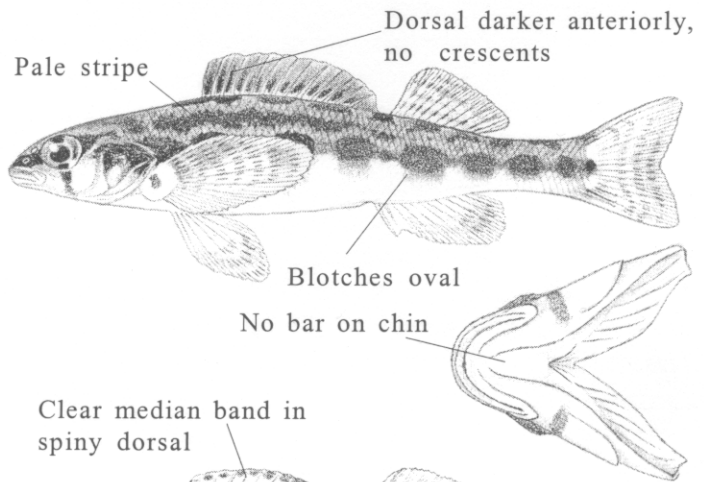
Snout extends anterior to mouth



Vertical bars on body

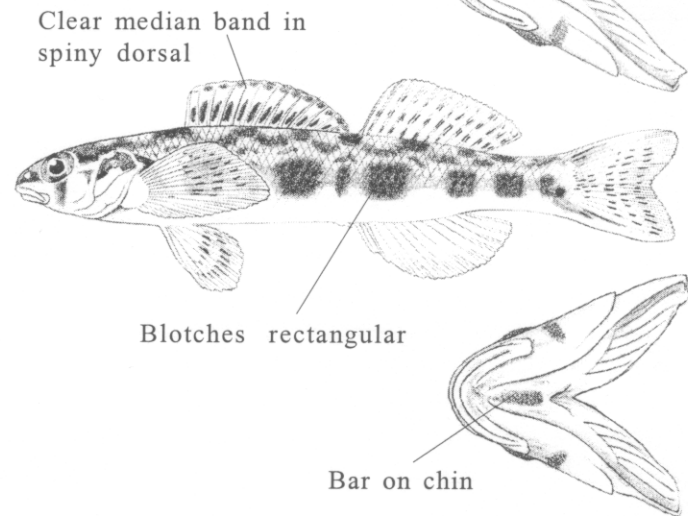
- E. Distinctive pale yellow dorsolateral stripe above a midlateral series of 6-8 horizontally oval black blotches (not rectangular) connected by a thin black stripe; cheek partly scaled. Breast unscaled; belly unscaled anteriorly on the male and along the midline of the female. No black bar on chin. Lateral scales 49-67 (52-63); pored scales on caudal fin 0-1 (0); scales above lateral line 5-9 (6-7); scales below lateral line 8-12 (9-10); transverse scales 16-19; scales around caudal peduncle 18-24 (20-22); dorsal spines 11-17 (13-15); dorsal rays 1-14 (11-12); pectoral branchiostegal rays 6. Patuxent drainage only.

Percina notogramma, stripeback darter



- E'. Pale yellow with 6 or 7 dark blotches connected by a narrow black stripe; cheeks, breast and opercles scaleless or nearly so. Chin with black or dusky bar, especially in large males. Lateral line scales (48) 53-61 (66). Midline of belly scaleless, or in males 2-9 large modified scales (modally 5-6) anterior to anus. First dorsal fin with wide, clear median band bordered basally by a row of black crescents and distally by a dusky or black band. Anal fin II, (8) 9 (11); dorsal fin (X) XII-XIV (XV), (11) 12-13 (14); pectoral rays 13-15. Head dark above and light below and with a bold suborbital bar, large dark blotch below the middle of the caudal base.

Percina peltata, shield darter

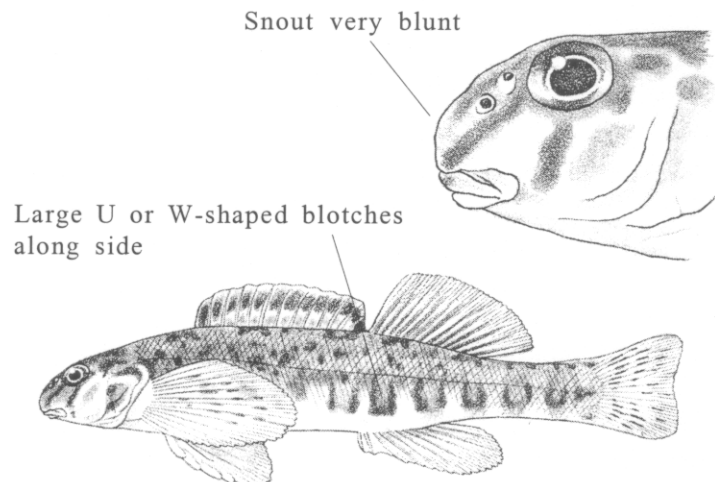


- F. Snout pointed or rather blunt, mouth not conspicuously inferior. Maxillary separated from the preorbital region for most of its length by a deep groove.

Go to G.

- F'. Snout very blunt, mouth inferior. Premaxillary protractile but maxillary attached to the preorbital region for most of its length with only a short groove at its posterior end. Lateral line scales (59) 66-80 (86); dorsal fin (XI) XIII-XIV (XVI), (11) 12-14 (16); anal fin II, (6) 7-9 (10); pectoral rays (13) 14-15 (16).

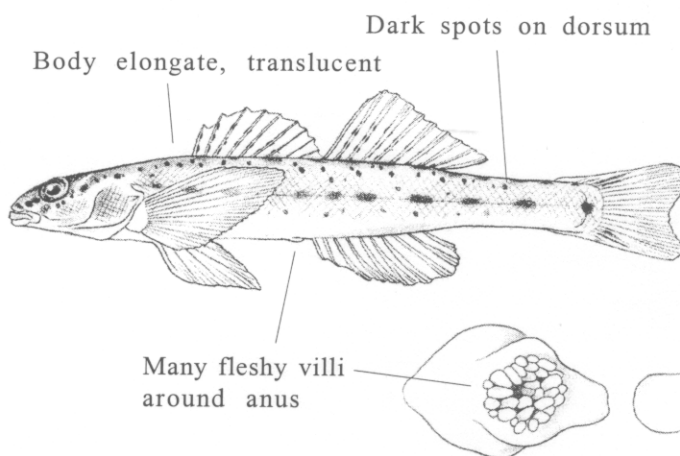
Etheostoma blennioides, greenside darter



- G. Body not exceedingly elongate and not translucent, anus not surrounded by large villi.

Go to H.

- G'. Body exceedingly elongate, translucent in life. Anus surrounded by large villi. Seven greenish saddles on back and 8-9 linear green or brown blotches along midline, darker spots on dorsum, pectoral fins exceedingly long. Abdominal region naked. Adult length 80 mm. Lateral line scales 50-65; dorsal fin VIII-IX, 13-14; anal fin I-II, 8-10; pectoral rays (12) 13 (14).
Etheostoma vitreum, glassy darter

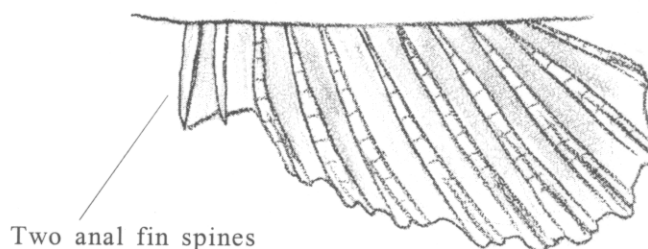
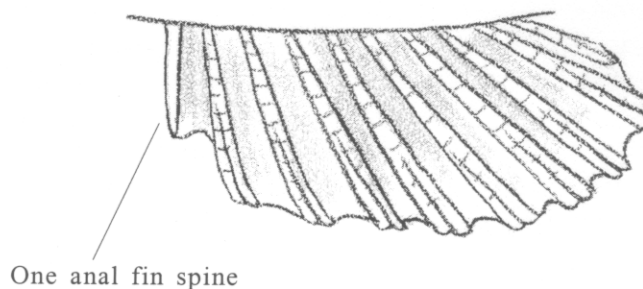


- H. Usually one weak, flexible anal spine.

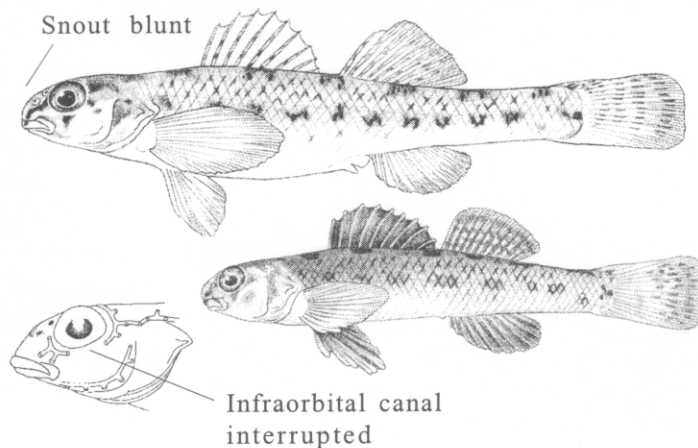
Go to I.

- H'. Usually two anal spines.

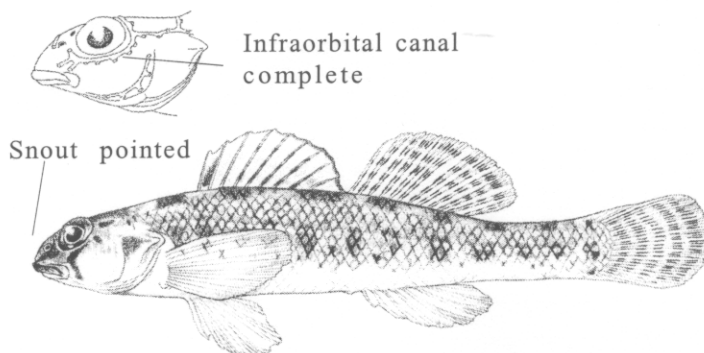
Go to J.



- I. Infraorbital canal usually interrupted with 4-6 pores in the anterior section and two in the posterior. Preoperculomandibular canal with 8-9 pores. Pectoral rays (10) 11-12 (13). Mouth horizontal, profile before the eyes steeply declivous so the profile is almost vertical at the mouth. Six or seven X or W-shaped marks along the sides of the body. Dorsal fin (VII) VIII-IX (X), (10) 11-12 (13); anal fin I (small, rarely II), 6-8 (9); lateral line scales (35) 37-44 (49); gill rakers usually with 6 pores, supratemporal canal interrupted. Youghiogheny basin, abundant.
***Etheostoma nigrum*, johnny darter**



- I'. Infraorbital canal usually complete with 8 pores. Preoperculomandibular canal with 10-11 pores. Mouth somewhat oblique, snout pointed, profile sloping at the mouth, premaxillary frenum absent. Nine to eleven X-or W-shaped marks along the midsides. Dorsal fin (VII) VIII-IX (XI), (10) 12-14 (17). Infraorbital and supratemporal canals uninterrupted, infraorbital canal with 8 pores. Lateral line scales (34) 36-58 (64); anal fin (0) I (II), (5) 7-9 (10); pectoral rays (10) 12-13(15); gill rakers on lower limb of first arch (7) 8-9 (10).
***Etheostoma olmstedii*, tessellated darter**



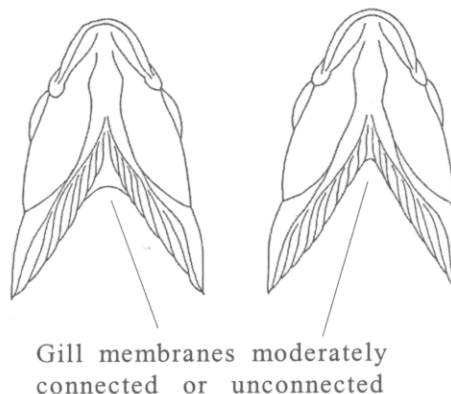
- J. Gill membranes broadly joined across the isthmus.

Go to K.



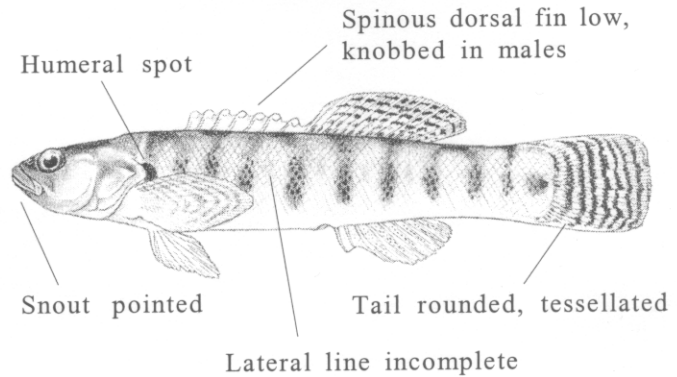
- J'. Gill membranes separate, or at most only slightly joined anteriorly, but never broadly joined across the isthmus.

Go to L.



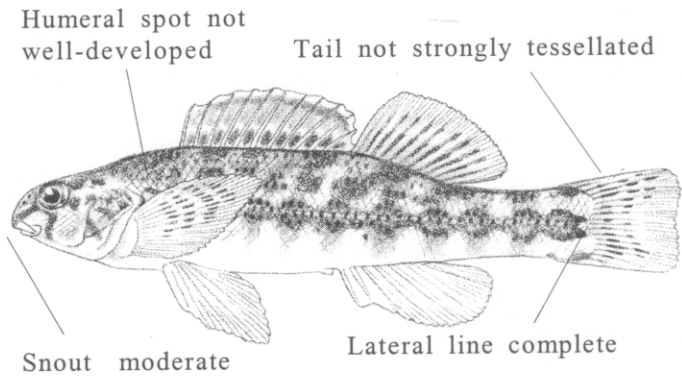
- K.** Lateral line incomplete. Dorsal fin (V) VII-VIII (IX), spines short and ending in fleshy knobs in mature males. At least 4 rows of scales between the lateral line and base of spinous dorsal. Shoulder region containing a markedly enlarged black humeral scale. Spinous dorsal low, about 1/2 height of soft dorsal. Midlateral scales (40) 46-54 (60), pored scales ending beneath soft dorsal. Tail rounded, finely tessellated. Mouth terminal, head long and narrow. Anal fin (I) II (III), (6) 7-9 (10); pectoral rays 11-13 (14).

Etheostoma flabellare, fantail darter



- K'.** Lateral line complete. Dorsal fin (VIII) XI (XII), (9) 11-13 (14). Dorsal spines longer and without fleshy tips. Gill covers broadly connected by a membrane extending across the isthmus. Cheeks and opercles scaled but scales may be embedded and difficult to see. No oblique band anterior to the dorsal fin but the rounded upper ends of two dark blotches almost meet in the midline, leaving a characteristic pale space just ahead of the dorsal fin. Body with 10 or more vertical bands, dark dorsal saddles usually 6 (rarely 7 or 8). POM pores usually 10, premaxillary frenum wide. Lateral line scales (39) 43-56 (63); anal fin II, (6) 7-8 (9); pectoral rays (12) 13-15 (16). Susquehanna Basin, introduced.

Etheostoma zonale, banded darter

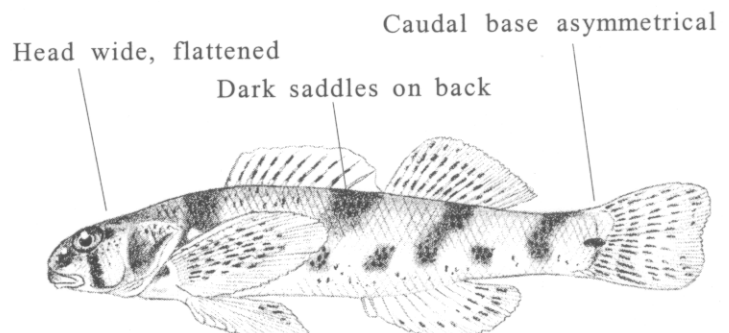


- L.** Lateral line quite incomplete, caudal fin base symmetrical.

Go to **M.**

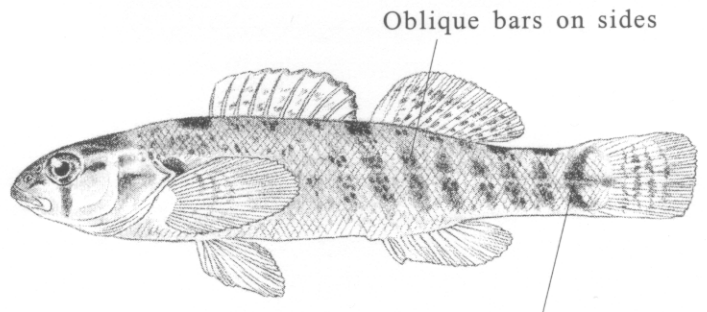
- L'.** Lateral line complete, caudal fin base asymmetrical, upper half extending further posteriorly than lower half. Dorsal rays 11; lateral line scales 46-50. Reddish brown, with 4 large jet-black saddles extending obliquely down and forward to below the lateral line. Known only from Susquehanna drainage near Fall Line.

Etheostoma sellare, Maryland darter



- M.** Lateral line ending below the soft dorsal fin. At least 4 rows of scales between lateral line and base of spinous dorsal. Body rather deep, its greatest depth about 4.0 to 4.5 times in standard length. Midlateral scales (36) 41-50 (57). Dorsal fin (VIII) X (XI), (10) 12-14 (15); anal fin II, 6-7; pectoral rays (10) 13 (15). Cheeks unscaled, belly behind pelvic fins covered with imbricated scales, body covered with bars and blotches. Infraorbital canal uninterrupted. Introduced into Potomac drainage.

Etheostoma caeruleum, rainbow darter

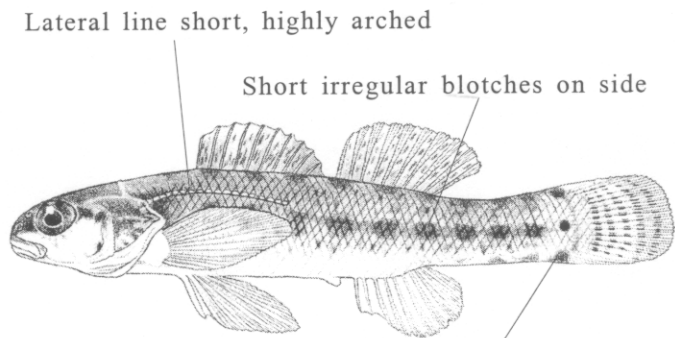


Oblique bars on sides

Reversed "trident" on caudal peduncle

- M'.** Lateral line noticeably arched and shorter, ending below spiny dorsal. Only 3 rows of scales between the lateral line and the base of the spiny dorsal fin. Body slender, its greatest depth 5.5 to 6.5 times in standard length. Midlateral scales (40) 46-50 (62). Lateral band broad, black, blotchy, and irregular. Dorsal fin (VIII) IX-XI (XIII), (8) 9-10 (11); anal fin II, (5) 6-8 (9); pectoral rays (12) 13 (15). Cheeks and breast fully scaled. Infraorbital canal interrupted.

Etheostoma fusiforme, swamp darter



Lateral line short, highly arched

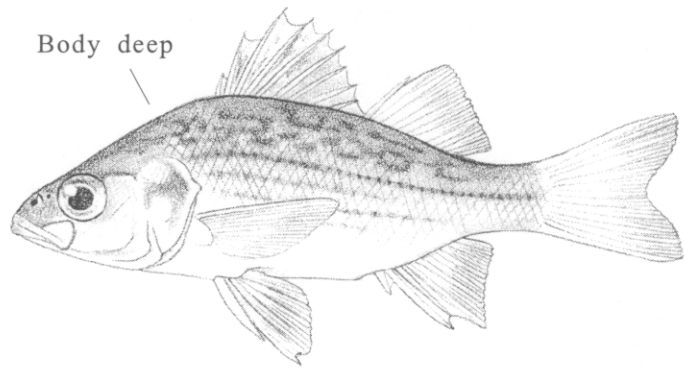
Short irregular blotches on side

Vertical row of three spots on caudal peduncle

KEY TO THE TEMPERATE BASSES

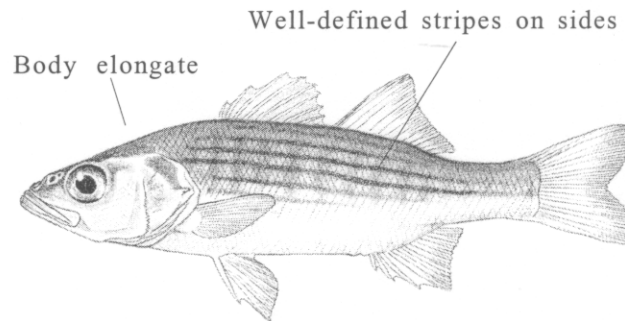
- A.** First and second dorsal fins definitely connected by membrane. No teeth on tongue. Anal fin spines II and III nearly equal in length; spine II robust. Body without dark longitudinal lines although light spots on scales may suggest many pale longitudinal lines. Chin often pink-purple. Lateral line scales (44) 46-49 (52); first dorsal fin (VIII) IX (XI) second dorsal fin I, (10) 11-12 (13); anal fin III (II in small young), (8) 9-10; pectoral rays (10) 14-17 (18).

Morone americana, white perch

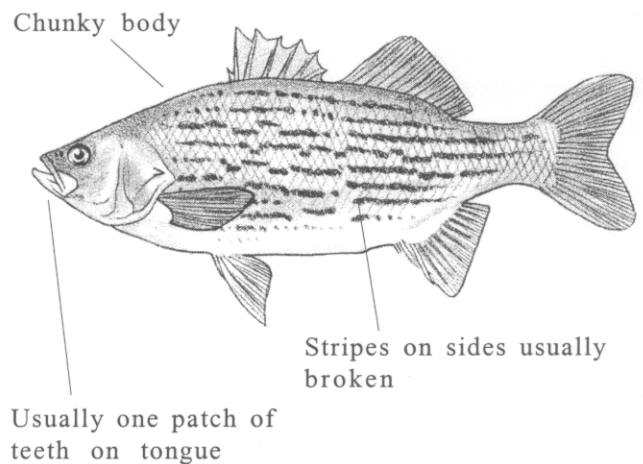


- A'.** First and second dorsal spines separate or nearly so. Base of tongue with 2 patches of teeth, approximately equal in size. Anal spine II distinctly shorter than spine III. Body elongate, its greatest depth distinctly less than the length of the head. Longitudinal stripes generally uniform and continuous. Young up to 100 mm long with about 10 narrow, indistinct vertical bars. Lateral line scales (53) 57-63(65); first dorsal fin (VIII) IX-X (XI); second dorsal fin I, (10) 11-12 (14); anal spines III (II in small young), (9) 10-11 (12); pectoral rays (13) 14-16 (17). Piedmont and Coastal Plain.

Morone saxatilis, striped bass



***Note:** Hybrids between white bass (*Morone chrysops*) and striped bass (*M. saxatilis*) have been introduced into several Maryland reservoirs. These can be identified on the basis of a stockier body than *M. saxatilis*, as well as a pattern of broken stripes along the side. They are often referred to as "wipers."



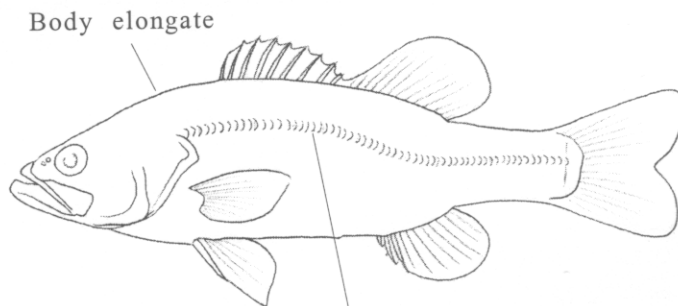
KEY TO THE SUNFISHES

- A. Lateral line scales more than 55. Body elongate, its depth contained 3 to 5 times in standard length.

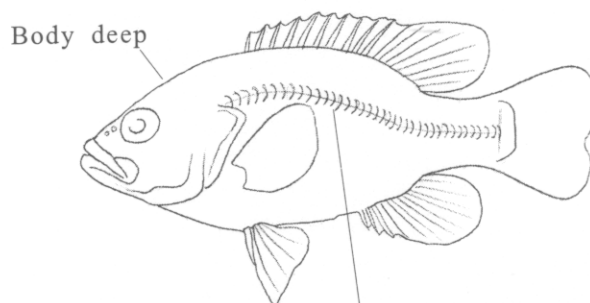
Go to B.

- A'. Fewer than 53 lateral line scales. Body deep and compressed, its greatest depth contained 2 to 2.7 times in standard length.

Go to C.



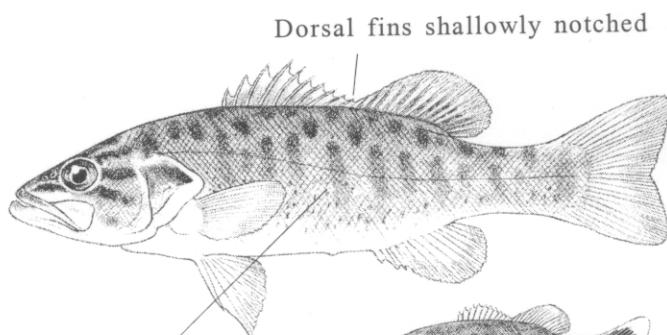
More than 55 scales in lateral line



Fewer than 53 scales in lateral line

- B. Dorsal fin with a shallow notch, its shortest spine more than 1/2 as long as the longest. Mouth smaller, the end of the maxillary bone reaching to below the middle of the pupil of the eye. Color brown or brassy, pattern uniform or consisting of 1 or 2 series of vertical bars on a lighter background. Young less than about 150 mm have an orange area at the base of the tail, separated from the clear outer part of the caudal fin by a black band. Lateral line scales (68) 71-77 (81); dorsal fin (IX) X (XI), (12) 14 (15); anal fin (II) III, (9) 11 (12); pectoral rays (15) 16-17 (18).

Micropterus dolomieu, smallmouth bass

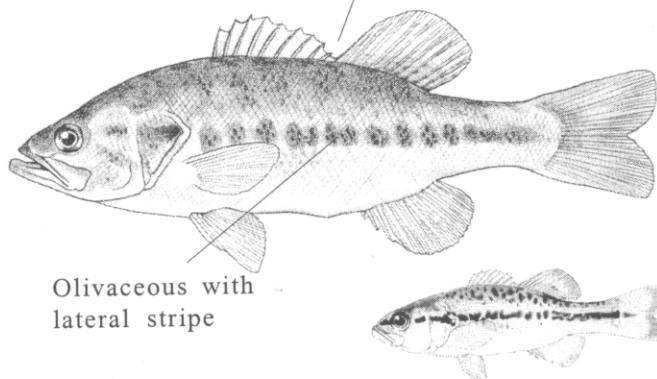


Brown or brassy
with vertical bars
on sides

Dorsal fins with deep notch

- B'. Dorsal fin with a deep notch, its shortest spine less than 1/2 as long as the longest. Mouth large, the end of the maxillary reaching beyond the posterior border of the eye (shorter in small juveniles). Color green rather than bronze, often with a prominent longitudinal stripe (blotchy) along the midside. Young without orange and black bands on tail (may have an orange or reddish wash, however). Lateral line scales (58) 61-65 (69); dorsal fin (IX) X (XI), (11) 12-13 (14); anal fin (II) III, (10) 11 (12); pectoral rays (13) 14-15 (17).

Micropterus salmoides, largemouth bass



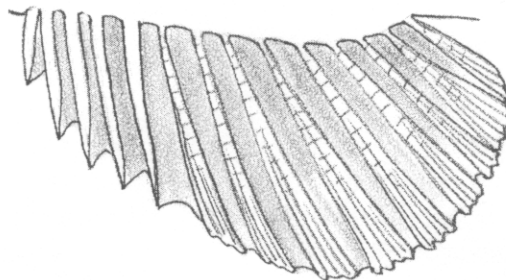
Olivaceous with
lateral stripe

C. Anal spines 4 or more.

Go to D.

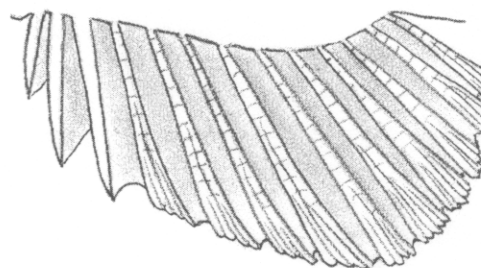
C'. Anal spines 3.

Go to H.



More than 4 anal fin spines

3 anal fin spines

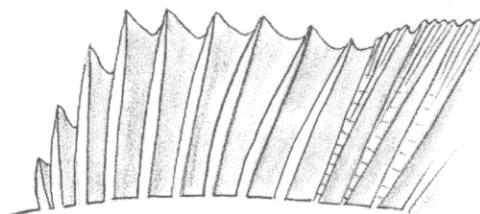


D. Dorsal spines 10 or fewer.

Go to E.

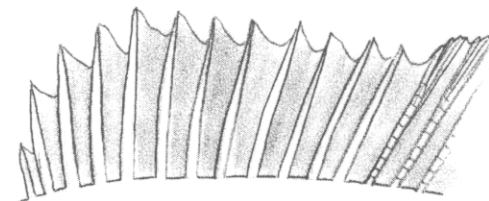
D'. Dorsal spines 11 or more.

Go to F.



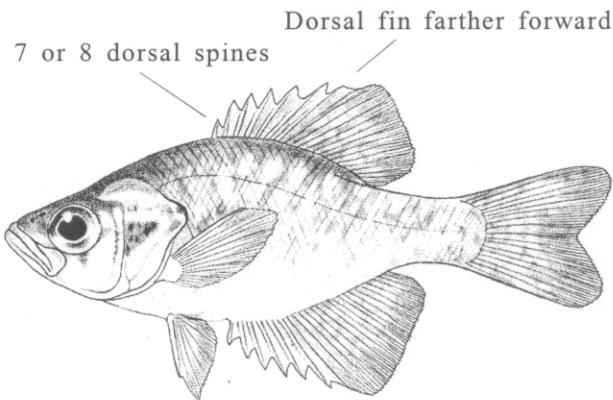
Less than 10 dorsal fin spines

More than 11 dorsal fin spines



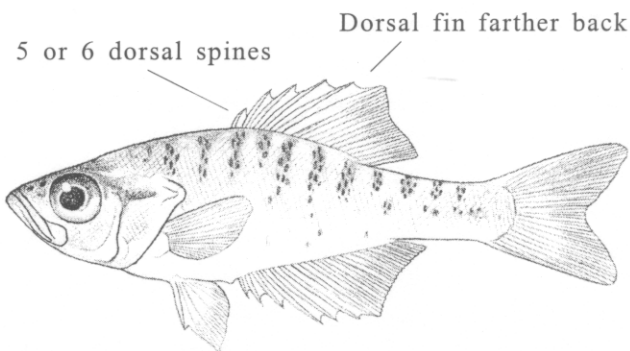
- E. Dorsal fin (VI rare) VII-VIII, 14-16. Length of dorsal fin base equal to or greater than distance from the dorsal origin to the back of the eye. Anal fin VI-VII, 16-18; lateral line scales 36-44; pectoral rays 13-15. Known to hybridize with *P. annularis* in Middle Potomac Basin, resulting in specimens with intermediate characteristics.

***Pomoxis nigromaculatus*, black crappie**



- E'. Dorsal fin V-VI (VII rare), (13) 14-15. Length of dorsal base less than the distance from the dorsal origin to the back of the eye. Anal fin VI-VII, 16-18; lateral line scales 34-44; pectoral fin rays 13.

***Pomoxis annularis*, white crappie**



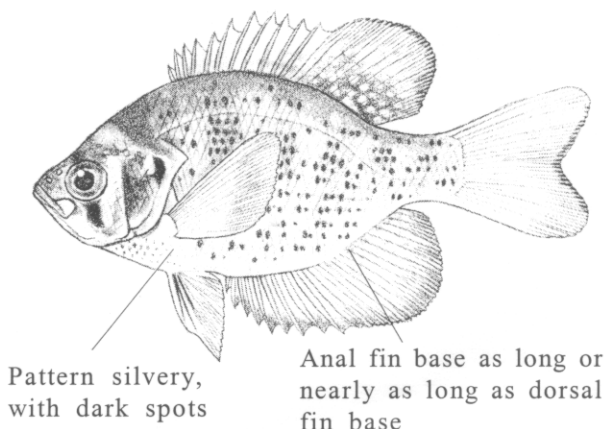
- F. Length of dorsal fin base noticeably greater than that of anal fin. Anal fin V-VI, 10-11; gill rakers 15 or less.

Go to G.

- F'. Length of dorsal fin base equal to or slightly greater than anal fin base. Anal fin VII-VIII, 13-15; 20 or more gill rakers on lower limb of 1st arch. Lateral line scales (36) 37-41 (42); dorsal fin (XI) XII (XIII), (12) 13-14; anal fin VII-VIII, (14) 15-16 (17); pectoral rays (11) 13-14. Coastal Plain of southern Maryland.

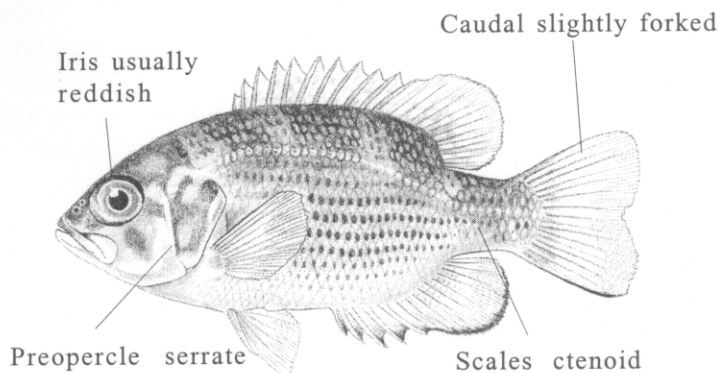
***Centrarchus macropterus*, flier**

Juveniles with dark spot surrounded by orange ring in soft dorsal fin



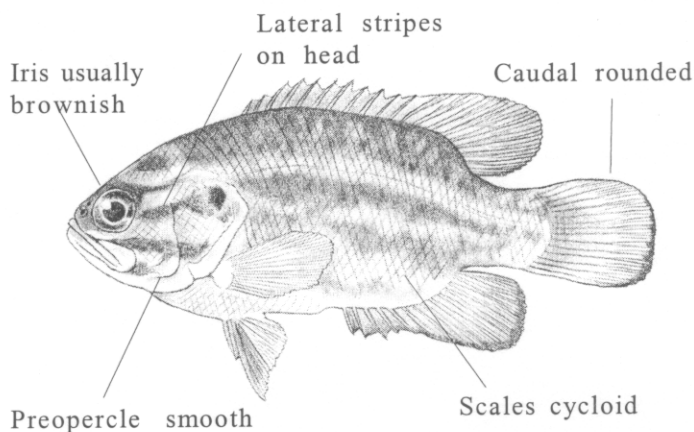
- G.** Scales ctenoid. Posterior part of the ventral edge of the preopercle serrate, the vertical and horizontal margins of the preopercle meeting at an angle of about 90 degrees. Rear edge of the preorbital bones serrate. Length of anal fin base about 1/2 length of dorsal fin base. Dorsal fin (X) XI-XII (XIII); anal fin V (VI); pectoral fin (12) 14-15; lateral line scales (35) 38-43 (45). Caudal fin somewhat forked. Color olive-green, sides brassy. Piedmont and Appalachian zones, common.

Ambloplites rupestris, rock bass



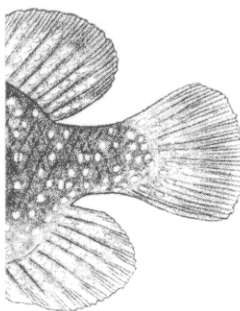
- G'.** Scales cycloid (smooth). Preopercle without dentation, its vertical and horizontal edges meeting in a smooth curve. Edge of the preorbital smooth. Mouth large. Caudal fin rounded. Eye color typically brown. Lateral line scales (34) 37-43 (45); dorsal fin (X) XI (XII), (9) 10-12 (13); anal fin (IV) V (VI), (9) 10 (11); pectoral rays 14-15. Coastal plain, rare.

Acantharcus pomotis, mud sunfish



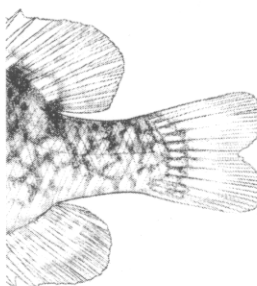
- H.** Caudal fin rounded (may be truncate).

Go to **I.**



- H'.** Caudal fin forked.

Go to **K.**

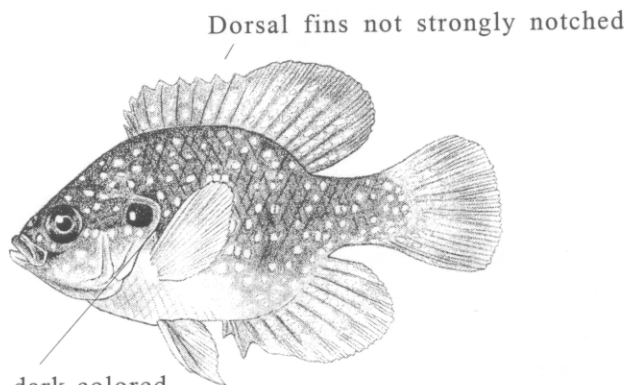


- I. Juncture of 1st and 2nd dorsals not noticeably notched.

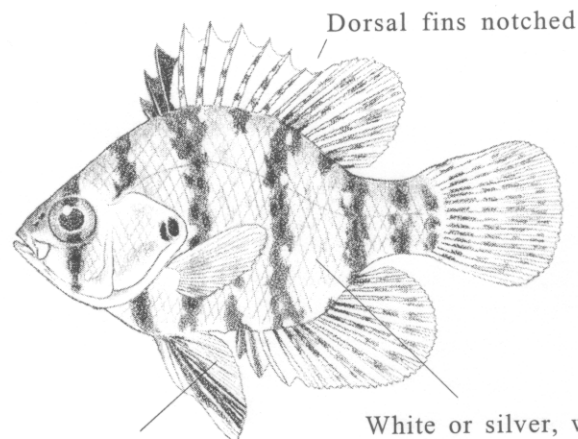
Go to J.

- I'. Juncture of 1st and 2nd dorsals noticeably notched and forming a wide "V". Dorsal fin X. Maxillary not reaching edge of the eye, color whitish with 4 to 8 black vertical bars. Midlateral scales (23) 25-29 (32); dorsal fin (VIII) X (XI), (10) 11-12 (13); anal fin III (IV), (10) 11-12 (14); pectoral fin rays (8) 9-11 (12). Adult size 75 mm. Eastern Shore, rare.

Enneacanthus chaetodon,
blackbanded sunfish



Usually dark-colored
or olivaceous

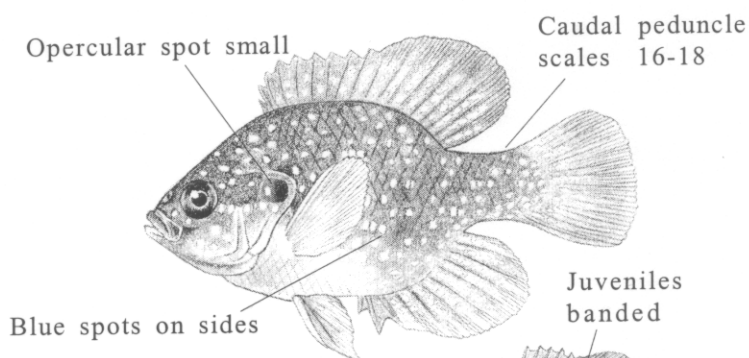


Red in pelvic fin

White or silver, with
black bars

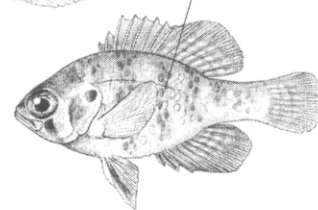
- J. Caudal peduncle scales larger (15) 16-18 (19). Color pattern of juveniles banded, that of large fish consisting of blue spots on a darker background. Pale spots on interradial membranes of dorsal fin surrounded with larger rings of dense melanophores. Maxillary extending as far back as anterior margin of pupil. Midlateral scales (25) 30-32 (35); dorsal fin (VII) VIII-IX (XI), (9) 10-12 (13); anal fin (II) III (IV), (8) 9-10 (13); pectoral fin rays (9) 12-13.

Enneacanthus gloriosus,
bluespotted sunfish



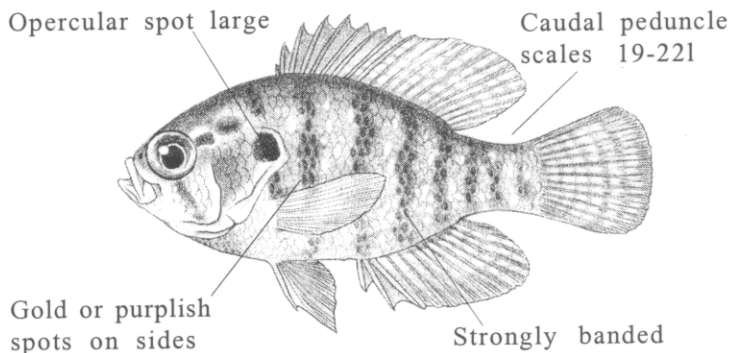
Blue spots on sides

Juveniles
banded



- J'. Caudal peduncle scales small, 19-22. Color pattern consisting of 5 to 8 distinct bands on a pale greenish background generally throughout life (may be absent in young). No blue (pales in preserved specimens) spots on sides; body and fins with purplish and/or golden spots in life. Pale spots on dorsal membrane not surrounded by dense melanophores. Maxillary extending as far back as center of pupil. Midlateral scales (27) 30-32 (35); dorsal fin (VII) VIII-IX (XI), (9) 10-12 (13), anal fin III, (9) 10-11 (14); pectoral fin (10) 11-13.

Enneacanthus obesus, banded sunfish



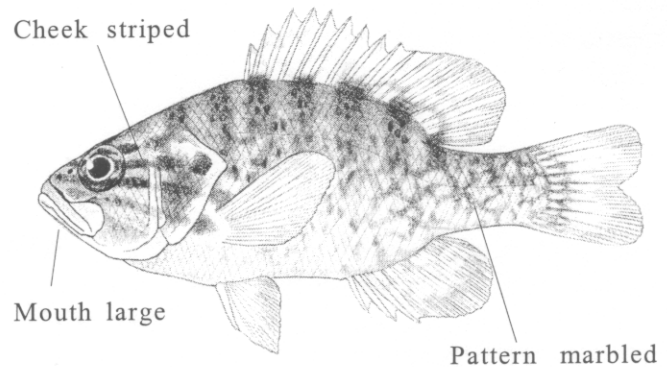
Gold or purplish
spots on sides

Strongly banded

- K.** Mouth smaller, maxillary ending below or in advance of the front of the eye. No teeth on tongue. Supramaxillary absent or shorter than the maximum width of the maxillary bone.

Go to **L.**

- K'.** Mouth large, maxillary ending below the middle of the eye. Tongue with teeth. Supramaxillary bone longer than the widest part of the maxillary bone. Cheeks often with 3 to 4 dark bands, young conspicuously barred. Dorsal fin (IX) X (XI), 9-11; anal fin III, 9-10; pectoral fin (12) 14; lateral line scales (38) 41-45 (48).
Lepomis gulosus, warmouth

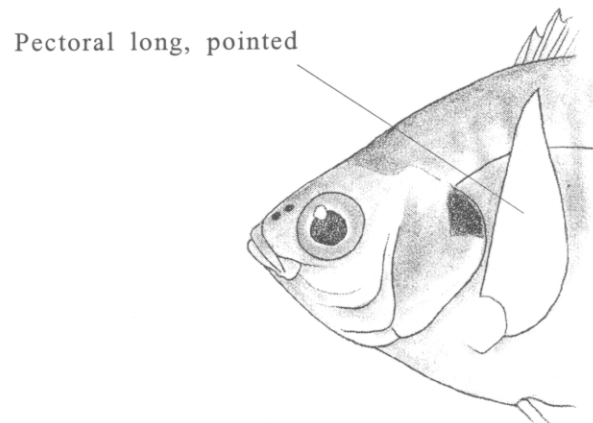
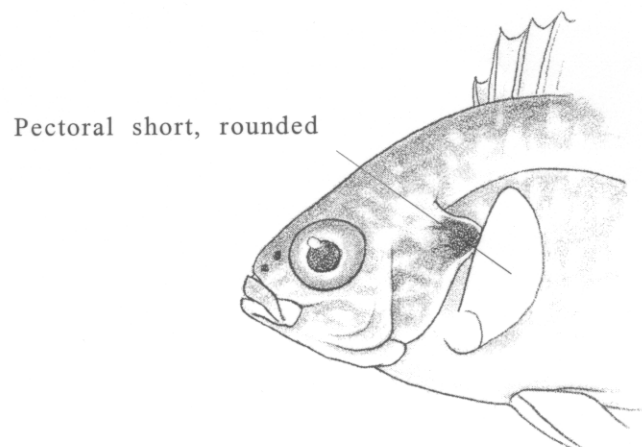


- L.** Pectoral fin short and rounded, not reaching past the lateral line when bent upward (may reach in juvenile specimens).

Go to **M.**

- L'.** Pectoral fin long and pointed, its tip reaching above the lateral line when bent forward so that it is parallel to the edge of the gill cover.

Go to **O.**

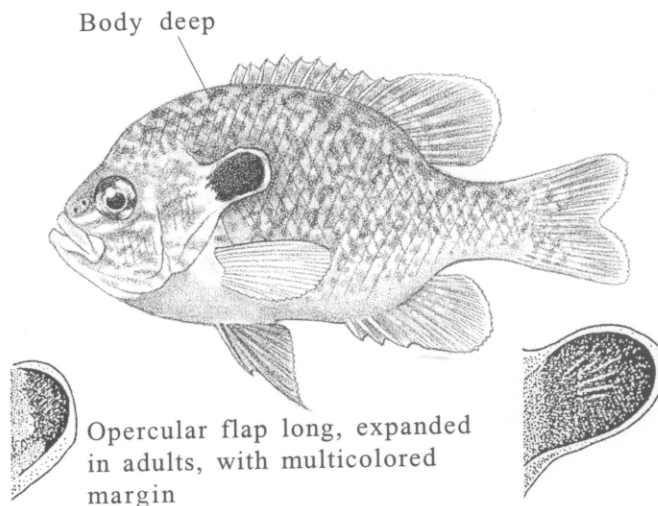


- M. Body more elongate, standard length 2.3 to 2.75 times depth.

Go to N.

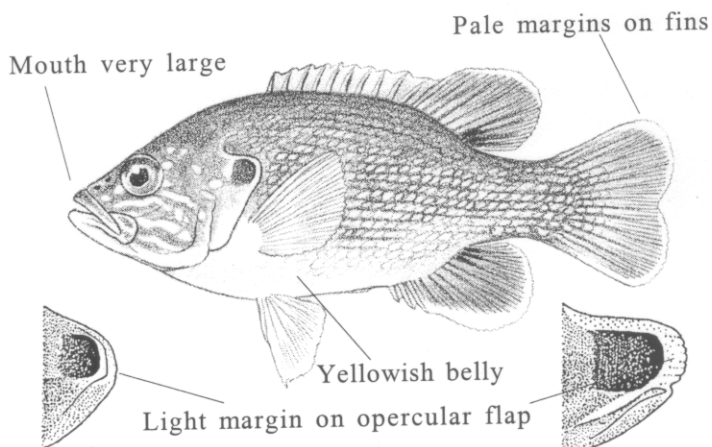
- M'. Body short and deep, its depth contained about twice in the standard length. Edge of bony opercle, not the membrane, soft, flexible, and ragged. Opercular flap with red/orange/whitemargin. Lateral line scales (35) 38-44 (46); dorsal fin (IX) X (XI), (10) 11 (12); anal fin III, 9-10 (12); pectoral fin rays 13-14 (15); 12 gill rakers on lower limb of first arch. No orange spots on cheek or body.

Lepomis megalotis, longear sunfish



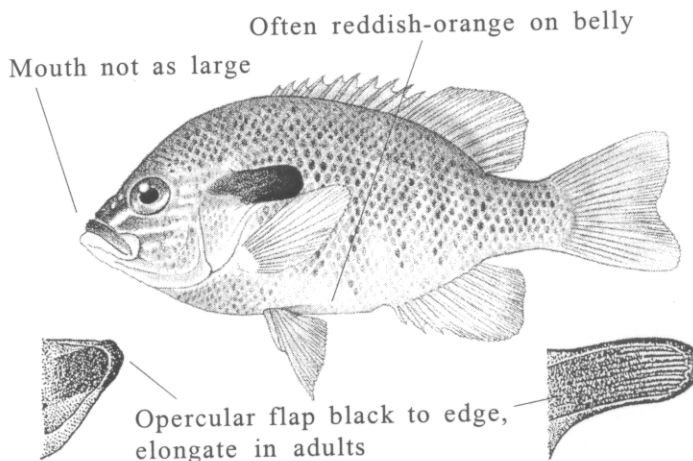
- N. Mouth large, maxillary ending below front of pupil. Eye small, equal to or shorter than snout length. Gill rakers long, their tips reaching to the base of the second raker below. Opercular flap with a light margin, yellow to red in life, about equal to eye diameter. Opercular bone stiff to its margin, as wide as long. Adult males with black spots at the bases of the posterior soft rays of both the dorsal and anal fins. Anterior portion of ventral fins edged in white. Dorsal fin (IX) X (XII), 10-11 (12); anal fin III, (8) 9-10 (11); lateral line scales (43) 46-50 (53); pectoral fin 13-14 (15).

Lepomis cyanellus, green sunfish



- N'. Mouth smaller, maxillary ending below front of eye. Eye wider than snout. Gill rakers short, not reaching the second raker below. Opercular flap black, without a pale margin, very long in adults and width less than eye diameter. Opercle bone flexible and ragged at its margin, much longer than wide. Lateral line scales (39) 42-46 (54); dorsal fin (IX) X (XI), (10) 11-12; anal fin III, (8) 9-10; pectoral fin (13) 14-15; 8 gill rakers on lower limb of first arch. Color often olivaceous, belly and fins reddish.

Lepomis auritus, redbreast sunfish



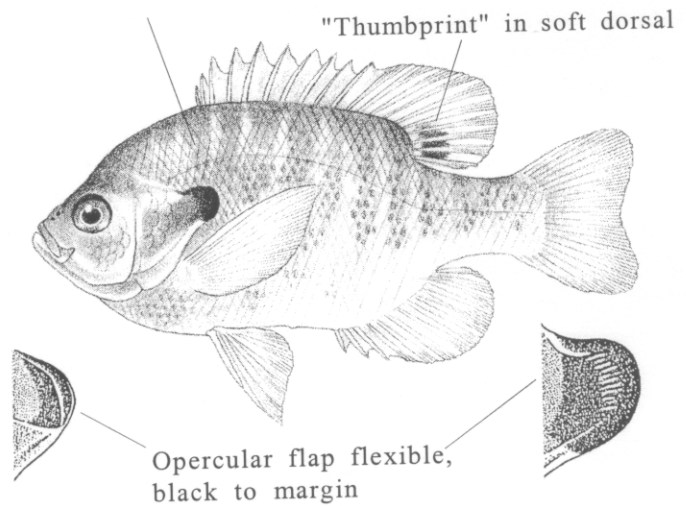
- O. Opercle stiff to its bony margin, not flexible on its posterior edge.

Go to P.

- O'. Opercle extended backward as a thin, flexible flap, black to its margin. A prominent "thumbprint" on the soft dorsal fin. Gill rakers long, reaching the base of the second or third raker below (young *L. gibbosus* have gill rakers very similar to *L. macrochirus*). Color in young purplish-silvery, with greenish cross bars, color in older fish dusky with coppery-red or yellowish belly. Dorsal fin (IX) X (XII), (9) 10-11 (13); anal fin III, (9) 11-12; lateral line scales (38) 41-46 (50); pectoral fin rays (12) 13-14 (15); 12 gill rakers on lower limb of first arch.

Lepomis macrochirus, bluegill

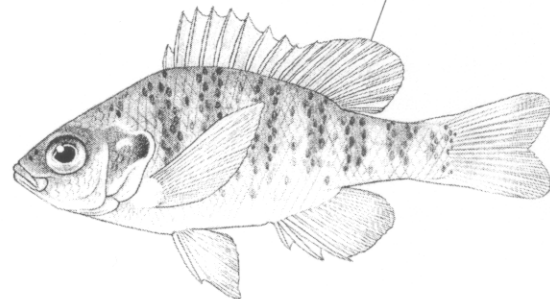
Usually with vertical bands



- P. Soft dorsal fin without definite spots, bony opercular margin slightly flexible, but much less than *L. macrochirus* or *L. gibbosus*. Lateral line scales (40) 41-44 (47); dorsal fin X (XI), (10) 11-12; anal fin III, (9) 10-11; pectoral fin rays 13-15(16).

Lepomis microlophus, redear sunfish

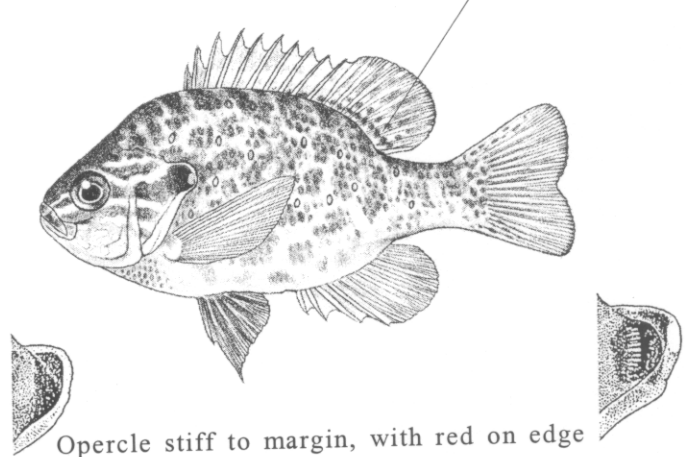
Dorsal fin evenly pigmented



- P'. Soft dorsal with definite spotted markings, bony opercular flap very stiff with a light margin. In life, there is a red sector at the lower corner of the flap. No prominent spot in the dorsal fin. Gill rakers shorter, not reaching the base of the second one below. Color typically greenish olive, sides bluish, belly yellow, lower fins yellow or orange, sides mottled with light orange. Dorsal fin (IX) X (XII), (10) 11-12 (13); anal fin III (IV), (8) 9-10 (12); lateral line scales (35) 37-44 (47); pectoral fin rays (11) 12-13 (14); 9-10 gill rakers on lower limb of first arch.

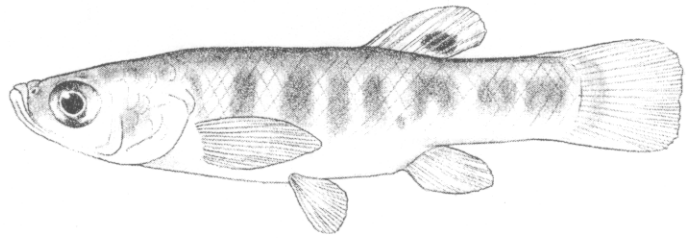
Lepomis gibbosus, pumpkinseed

Dorsal fin mottled posteriorly



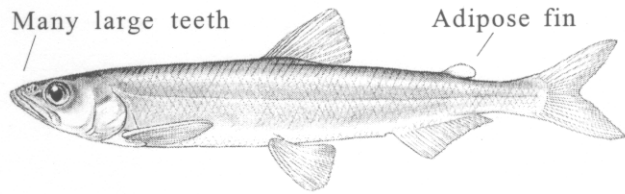
The Weird Ones: Fishes not known from freshwater in Maryland, but which you might encounter in the field if you hit a freshwater lens or are monkeying around with a seine or dipnet when you should be working...

Fundulus luciae, spotfin killifish. Inhabits really really shallow (5-15 cm deep) areas of vegetated saltmarshes in the Bay.

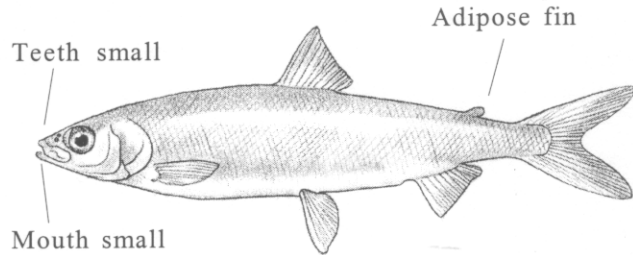


The Weirder Ones: Fishes not known to be established in Maryland, but which you might encounter in the field...

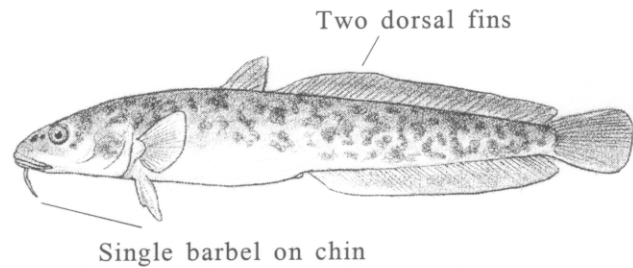
Osmerus mordax, rainbow smelt. Experimentally introduced into several Maryland reservoirs in an attempt to increase forage base.



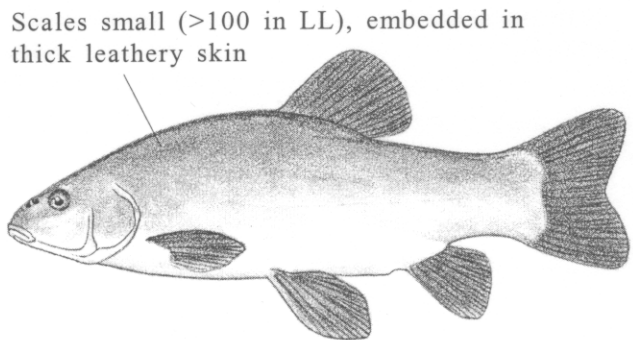
Coregonus artedii, lake herring. Introduced into Conowingo Reservoir, has been taken below dam in Maryland.



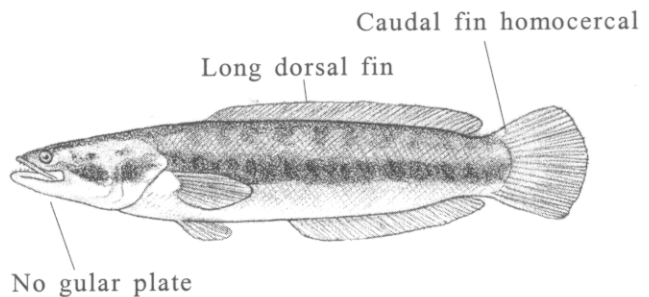
Lota lota, burbot. Single record from mainstem Susquehanna River.



Tinca tinca, tench. Introduced into lower Potomac River drainage around the turn of the century.



Scardinius erythrophthalmus, rudd. Used as a bait minnow and also popular in the pet trade, accidentally introduced into Potomac River drainage.



Channa spp., snakehead. Accidentally introduced from pet trade and as exotic food fish. *Channa micropeltis* pictured.

